NEW YORK
IRON WORKS

WM. G. NEILSON

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THE

CHARCOAL BLAST FURNACES, ROLLING MILLS,

FORGES AND STEEL WORKS,

OF

New York,

IN

1867.

COMPILED FOR

THE AMERICAN IRON AND STEEL ASSOCIATION,

By WM. G. NEILSON.

Billings

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IRON WORKS IN NEW YORK.

TABLE OF CHARCOAL BLAST FURNACES.

A TABLE showing the name, owner, location, date of erection, and size of each Furnace; kind of blast and power used; Production from 1854 *to* 1866. *Utmost annual (present) capacity. The amount of ore, flux, and fuel consumed in* 1864. *Capital invested, &c. &c.*

No.	NAME OF WORKS.	OWNERS AND LESSEES, OR PRINCIPAL OFFICERS.	LOCATION AND POST-OFFICE.	FURNACES. Date of Erection.	Height in Feet.	Width of Bosh. In Feet	BLAST. Temperature.	Pressure, lbs. to sq. Inch.	No. of Tuyeres.	Diameter of Tuyeres. Inches.	POWER. Water Wheels.	Steam. Engines.	Diam. of Cylinder. Inch.	Stroke of Piston. Inch.
	Dannemora Furnace, .	*Abandoned,*	State Pris.yd, Danemora, Clinton Co.	1854	. .	. .	. .	. .	. .	. .	. .	.	. .	.
1	Fletcherville Furnace, .	Witherbees & Fletcher, *Own.* J. B. Bailey, *Agt. & Man.,*	Fletcherville, Moriah, Essex Co., P. O., Port Henry, Essex Co.	1864–5	42	11	warm	1	6	$2\frac{1}{4}$	0	0	20	60
2	Crown Point Iron Co., .	C. F. Hammond. E. S. Bogue.	10 m. W. of Crown Point Land'g, Essex Co. P.O., Crown Point.	1845	42	10	warm	$\frac{3}{4}$	6	3 of $3\frac{1}{2}$ 3 of 1	0	1	15	60
	Adirondack Iron Works,	*Abandoned,*	48 miles W. of Crown Point Landing, Essex Co.,	1854	. .	. .	. .	. .	. .	. .	. .	.	. .	.
	Mount Hope Furnace, .	*Abandoned,*	8 miles N. W. of Fort Ann, Washington Co.	1836	. .	. .	. .	. .	. .	. .	. .	.	. .	.
3	Copake Iron Works, . .	Fred'k Miles, *Owner & Man.,*	Copake, Columbia Co., ...	1845	32	9	warm	$\frac{8}{10}$	2	3	1	1	12	48
4	Phenix Furnace, . . .	C. S. Maltby, *Owner.* T. J. Houston, *Supt.*	$1\frac{1}{2}$ mile N. E. of Millerton Station, Dutchess Co.	1847	33	$9\frac{1}{2}$	600°	$\frac{7}{10}$	3	$2\frac{3}{4}$	0	1	13	48
5	Millerton Iron Co., . .	William H. Barnum, *Pres.* W. Phelps, Jr., *Treas.*	1 mile N. of Millerton Station, Dutchess Co.	1854	$32\frac{1}{2}$	$9\frac{1}{2}$	300°	$\frac{8}{10}$	5	3	0	1	16	42
6	Wassaic Furnace, . . .	Noah Gridley, *Owner.* John A. Beckley, *Lessee.*	Wassaic Station, Dutchess Co.,	1826	32	9	350°	$\frac{7}{8}$	2	$2\frac{3}{4}$	1	0	0	0
	Dover Furnace, . . .	*Abandoned,*	Near Dover Plains, Dutchess Co.,	1835	. .	. .	. .	. .	. .	. .	. .	.	. .	.
7	Dutchess Co. Iron Works,	W. T. Sears, *Pres.* D. B. Martin, *Manager.*	4 miles S. of Dover Plains, Dutchess Co. P.O., Dover, Dutchess Co.	1847	34	9	warm	$\frac{3}{4}$*	2	3	1	0	0	0
8	Beekman's Furnace, . .	Sterling, Foster & Co., . . .	Beekman, 13 miles E. of Poughkeepsie, Dutchess Co.	1830	34	9	warm	$\frac{3}{4}$	3	$2\frac{1}{2}$	1	0	0	0
9	Hopewell Furnace, . .	G. Niver and J. G. & W. S. Dudley, *Lessees.*	Hopewell, E. Fishkill, Dutchess Co.,		38*	9	warm	$\frac{3}{4}$*	3	$2\frac{1}{4}$*	1	0	0	0
10	Greenwood Iron Works, .	R. P. & P. P. Parrott, *Owners,* Peter P. Parrott, *Manager.*	$\frac{3}{4}$ mile from Greenwood Station, Monroe, Orange Co. P.O., P.P. Parrott, Greenwood Iron Works, Orange Co.	1813	42	$10\frac{3}{4}$	250°	$\frac{1}{2}$	3	3	1	0	0	0
11	Southfield Furnace, . .	Sterling Iron & Railway Co. J. Dutton Steele, *Pres.* A. W. Humphreys, *Treas.*	Orange Co. P. O. box, 1384 New York.	1806	41	12	500°*	1	3	2	1	0	0	0
	Sterling Furnace, . .	" " " " *Now an anthracite furnace.*		1848	. .	. .	. .	. .	. .	. .	. .	.	. .	.
	Brasher Furnace, . . .	*Abandoned,*	8 miles N. E. of Brasher Station, St. Lawrence Co.	1835	. .	. .	. .	. .	. .	. .	. .	.	. .	.
	Myers Steel & Iron Co., .	Charles G. Myers, *Pres.* George R. Myers, *Sec.*	Clifton T., 20 miles S.E. of De Kalb Junction, St. Lawrence Co.	1866–7	—	—	—	—	—	—	—	—	—	—
12	Cooper's Falls Iron Co., .	J. W. Lowden, *Agt.,* . . .	3 miles W. of De Kalb Junction. P.O., De Kalb, St. Lawrence Co.	1865	34	10	cold	$\frac{1}{2}$	2	$2\frac{1}{2}$	1	0	0	0
13	Rossie Iron Works, . .	Samuel W. Torrey, *Pres.* Charles R. Westbrook, *Supt.*	Rossie, St. Lawrence Co., . .	1805*	43	9	warm	$2\frac{1}{2}$	2	$4\frac{1}{2}$	2	0	0	0
	Fullersville Iron Works,	*Abandoned,*	Fullersville, St. Lawrence Co., .	1833	. .	. .	. .	. .	. .	. .	. .	.	. .	.
	Wegatchie Furnace, . .	*Abandoned,*	Wegatchie, 7 miles N. of Antwerp, Jefferson Co.	1846	. .	. .	. .	. .	. .	. .	. .	.	. .	.
14	Redwood Furnace, . .	S. C. Sardam, *Owner,* . . .	Redwood, Jefferson Co., . . .	1847	30	8	warm		2	$2\frac{1}{2}$	1	0	0	0
	Sterlingburgh Furnace, .	*Abandoned,*	$1\frac{1}{2}$ mile E. of Antwerp, Jefferson Co.,	1846	. .	. .	. .	. .	. .	. .	. .	.	. .	.
15	Sterling Iron Works, . .	James Sterling, *Agt.* R. H. Sterling, *Founder.*	Sterlingville, Jefferson Co., . .	1837	30	$8\frac{1}{2}$	cold		1	3	1	0	0	0
16	Carthage Iron Works, .	Cole & Allen, *Owners.* J. C. Budd, *Agt.*	Carthage, Jefferson Co., . . .	1819	30	9	warm		2	$2\frac{1}{2}$	1	0	0	0
17	Sterling Bush Iron Works,	A. P. Sterling, *Lessee,* . . .	Sterling Bush, Diana T., Lewis Co. P.O., Antwerp, Jefferson Co.	1837	30	9	cold		1	3	1	0	0	0
18	Alpina Furnace, . . .	Z. H. Benton, *Owner,* . . .	16 miles S.E. of Antwerp, Lewis Co. P.O., Oxbow, Jefferson Co.	1846	32	9	warm & c'ld		2	$2\frac{1}{2}$	1	0	0	0
19	Port Leyden Iron Co., .	H. D. H. Snyder, *Pres.* Charles H. Sayre, *Sec.*	Port Leyden, Lewis Co. P.O., Chas. H. Sayre, Utica, N.Y.	1864–5	37	9	warm	$\frac{7}{8}$	3	$2\frac{1}{2}$	2	0	0	0
20	" " "				32	9			3					
	Taberg Iron Works, . .	*Abandoned,*	Taberg, Oneida Co. P.O., H.S. Armstrong, Rome, N.Y.	1809	. .	. .	. .	. .	. .	. .	. .	.	. .	.
	Constantia Furnace, . .	*Abandoned,*	N. shore of Oneida Lake, Oswego Co.	old	. .	. .	. .	. .	. .	. .	. .	.	. .	.
21	Norwich Blast Furnace, .	B. B. Andrews. N. C. & J. Scoville.	Norwich, Chenango Co., . . . P.O., B. B. Andrews, Norwich	1856	32	9	700°	2	2	$3\frac{1}{2}$	0	1	18	48
	Norwich Iron Works, .	*Now an anthracite furnace, but out of blast.*	Norwich, Chenango Co., . . .	1856	. .	. .	. .	. .	. .	. .	. .	.	. .	.
22	Wolcott Furnace, . . .	J. H. Gould, *Lessee.* J. R. Wagner, *Agt.*	$1\frac{1}{2}$ mile N. of Wolcott Village, Wayne Co.	1821	35	9	warm	1*	2	$2\frac{1}{2}$*	1*	0	0	0
23	Ontario Furnace, . . .	A. J. Bixby, *Owner & Man.*	Ontario, Wayne Co., ...	1825	30	$7\frac{1}{2}$	warm	1*	2	$2\frac{1}{2}$	0	1	10	36
24	Clinton Furnace, . . .	J. H. Gould, *Owner.* Rufus Sweeting, *Agt.*	Ontario, Wayne Co., ...	1847	35	10	450°	$\frac{7}{10}$*	3	3	0	1	12	36
	Total, ...										18	7		

* Estimated.

Entered according to Act of Congress, in the year 1865, by HENRY MCALLISTER, JR., in the Clerk's Office of the District Court of the United States for the Eastern District of Pennsylvania.

IRON WORKS IN NEW YORK.

TABLE OF CHARCOAL BLAST FURNACES—(*Continued*).

A TABLE showing the name, owner, location, date of erection, and size of each Furnace; kind of blast and power used; Production from 1854 *to* 1866. *Utmost annual (present) capacity. The amount of ore, flux, and fuel consumed in* 1864. *Capital invested, &c. &c.*

NAME OF WORKS.	PRODUCTION. (In Tons of 2000 lbs.)												
	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Dannemora Furnace,	1,408	1,613	672	0	0	0	0	0	0	0	0	0	0
Fletcherville Furnace,	0	0	0	0	0	0	0	0	0	0	0	677	2,046
Crown Point Iron Co.,	3,360*	3,052*	3,651*	3,188*	3,332	3,202	3,949	3,381	3,342	3,373	2,825	2,430	2,310
Adirondack Iron Works,	0*	1,200*	1,200*	0*	0	0	0	0	0	0	0	0	0
Mount Hope Furnace,	2,038	1,456	1,456	1,372	0	0	0	0	0	0	0	0	0
Copake Iron Works,	1,743	505	1,513	0	0	0	0	924	2,220*	2,500	2,500	3,136	3,387
Phenix Furnace,	896*	1,053*	302*	0	0	0	0	0	0	0	0	451	2,800
Millerton Iron Co.,	305	1,112	415	100*	800*	0	0	0	0	0	98	3,079	2,004
Wassaic Furnace,	0	224	168	600	35	660	0	0	550	170	1,060	620	700
Dover Furnace,	672*	672*	28*	0	0	0	0	0	0	0	0	0	0
Dutchess Co. Iron Works,	952	319*	684	650*	500*	800	700	700	850	950	400	290	1,193
Beekman's Furnace,	1,792*	1,887	1,344	1,000*	800*	500*	500*	400*	500*	200*	200*	0	*
Hopewell Furnace,	750*	750*	750*	300*	0*	0*	0*	0*	300*	300*	500*	200*	75*
Greenwood Iron Works,	1,792*	1,568	1,680	1,311	1,820	1,280	2,097	1,855	2,105	1,136	1,721	734	1,427
Southfield Furnace,	2,276	647	0	0	0	1,542	2,064	0	1,822	1,131	2,415	1,805	2,464
Sterling Furnace,	2,680	2,619	2,144	2,274	2,905	2,539	2,817	2,701	2,320	2,849	2,248	674	0
Brasher Furnace,	336	448	134	0	0	0	0	0	0	0	0	0	0
Myers Steel and Iron Co.,	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooper's Falls Iron Co.,	0	0	0	0	0	0	0	0	0	0	0	0	255
Rossie Iron Works,	1,628	833	0	0	0	0	0	0	0	0	0	91	1,100*
Fullersville Iron Works,	717	717	784	246	0	0	0	0	0	0	0	0	0
Wegatchie Furnace,	572	704	1,240	1,120*	0*	0	0	0	0	0	0	0	0
Redwood Furnace,	400*	448	448	637	492	0	0	0	600	600	404	0	0
Sterlingburgh Furnace,	1,369	1,165	470	0*	0	0	0	0	0	0	0	0	0
Sterling Iron Works,	783	784	635	461	0	0	0	0	0	780	720	1,098	700
Carthage Iron Works,	0	0	0	0	0	0	0	0	0	0	0	637	759
Sterling Bush Iron Works,	1,210	1,481	1,344	1,045	1,000	60	0	470	425	1,400	1,275	1,200	300
Alpina Furnace,	672*	1,364	1,092	0	0	400*	0	0	0	0	0	0	0
Port Leyden Iron Co.,	0	0	0	0	0	0	0	0	0	0	0	1,100	550
" " "													
Taberg Iron Works,	1,904*	2,016	1,848	1,000*	1,700*	500*	500*	500*	600	700	600	500	100*
Constantia Furnace,	1,904*	2,016*	2,016*	560*	0*	0*	0	0	0	0	0	0	0
Norwich Blast Furnace,	0	0	426	2,258	0	0	0	0	0	1,200	1,300	2,000	1,800
Norwich Iron Works,	0	0	1,270*	1,375*	0*	0*	0	0	0	0	0	0	0
Wolcott Furnace,	448	495	524	444	600*	600*	600*	600*	600*	600*	600*	0	0
Ontario Furnace,	1,463	1,525	1,224	1,015	580	777	190	366	298	493	652	0	0
Clinton Furnace,	900	1,200	1,400	1,000	800	700	0	0	0	450	700	1,100	950
Total,	34,970	33,873	30,862	21,956	15,364	13,560	13,417	11,897	16,532	18,832	20,218	21,822	24,920

* Estimated.

IRON WORKS IN NEW YORK.

TABLE OF CHARCOAL BLAST FURNACES—(*Continued*).

A TABLE showing the name, owner, location, date of erection, and size of each Furnace; kind of blast and power used; Production from 1854 *to* 1866. *Utmost annual (present) capacity. The amount of ore, flux, and fuel consumed in* 1864. *Capital invested, &c. &c.*

NAME OF WORKS.	Utmost Annual (present) Capacity.	Capital Invested.	Weeks in operation in 1864.	CONSUMED IN 1864.			REMARKS.
				In Tons of 2000 lbs.		In Bushels.	
				Ore.	Flux.	Fuel.	
Dannemora Furnace,	. . .	. . .	0	0	0	0	Burned and abandoned in 1856.
Fletcherville Furnace,	3,300	$130,000	0	0	0	0	Use Magnetic ore.
Crown Point Iron Co.,	3,900	$	27	3,600	700	321,000	" " "
Adirondack Iron Works,	. . .	. . .	0	0	0	0	Abandoned about 1856.
Mount Hope Furnace,	. . .	. . .	0	0	0	0	Abandoned about 1857.
Copake Iron Works,	3,500	$	50	6,720*	900*	325,000	Use Brown Hematite.
Phenix Furnace,	3,600	$	0	0	0	0	" " "
Millerton Iron Co.,	3,600	$120,000	2	250*	49*	14,000*	" " "
Wassaic Furnace,	2,100	$	31	2,600	500	175,000	" " "
Dover Furnace,	. . .	. . .	0	0	0	0	Abandoned about 1857.
Dutchess Co. Iron Works,	1,800	$300,000	11	1,000	160	60,000	Use Brown Hematite.
Beekman's Furnace,	1,650	$	12	500	100	30,000	" " "
Hopewell Furnace,	1,750	$	15	1,200	250	75,000	" " "
Greenwood Iron Works,	2,240	$	50	4,495	0*	362,469	Use Magnetic ore.
Southfield Furnace,	2,800	$	40*	5,144	167	201,348	" " "
Sterling Furnace,	. . .	$	40	4,500	0	291,015	Now an anthracite furnace.
Brasher Furnace,	. . .	. . .	0	0	0	0	Abandoned about 1856.
Myers Steel and Iron Co.,	—	$25,0000	0	0	0	0	Now building. Will probably go in blast in the summer of 1867. Designed to use Magnetic ore.
Cooper's Falls Iron Co.,	2,500	$	0	0	0	0	Use Red Oxide.
Rossie Iron Works,	4,000	$	0	0	0	0	" "
Fullersville Iron Works,	. . .	. . .	0	0	0	0	Abandoned about 1857.
Wegatchie Furnace,	. . .	. . .	0	0	0	0	" " "
Redwood Furnace,	1,100	$13,000	14	826	76	78,000	Use Red Oxide and Canada Magnetic.
Sterlingburgh Furnace,	. . .	. . .	0	0	0	0	Abandoned about 1857.
Sterling Iron Works,	1,400	$	31	1,720	180	140,000	Use Red Oxide
Carthage Iron Works,	1,650	$	0	0	0	0	" "
Sterling Bush Iron Works,	1,650	$	40	2,820	180	208,000	" "
Alpina Furnace,	1,650	$	0	0	0	0	Out of blast for a number of years.
Port Leyden Iron Co.,	5,500	$	0	0	0	0	Use Clinton Fossiliferous and Lake Champlain Magnetic ores.
Taberg Iron Works,	. . .	$	20	1,350	0	90,000	Used Clinton and Verona Fossiliferous and Lake Champlain Magnetic. Out of blast, and will probably not go in again.
Constantia Furnace,	. . .	$	0	0	0	0	Abandoned about 1859.
Norwich Blast Furnace,	2,250	$	32	3,500*	400*	185,000*	Use Brown Hematite.
Norwich Iron Works,	. . .	. . .	0	0	0	0	Now an anthracite furnace, but out of blast.
Wolcott Furnace,	1,250	$	23*	1,350*	10*	110,000*	Use Fossiliferous ore.
Ontario Furnace,	1,500	$	23	1,450	10	120,000*	" " "
Clinton Furnace,	2,200	$30,000	20	1,600	0*	126,000	" " "
Total,	56,890			44,625	3,682	2,911,832	

CHARCOAL BLAST FURNACES IN NEW YORK.

MAGNETIC ore is found in the azoic formations of the northeastern and southeastern portions of the State: the former is known as the Lake Champlain district. Brown hematite is obtained at a number of beds east of the Hudson, near the Connecticut and Massachusetts lines. Red hematite occurs on the western border of the Lake Champlain district. Red fossiliferous ore is mined near Utica and in Wayne County.

There are two charcoal furnaces near Lake Champlain. A new furnace is being built near the western border of the azoic formation to work magnetic ore. The two Port Leyden furnaces are in the formation, but do not work the ore of their neighborhood.

The Greenwood and Southfield furnaces in Orange County work the magnetic ore of their section.

There are 7 furnaces east of the Hudson using brown hematite ore.

In St. Lawrence and adjoining counties are 7 furnaces, which are chiefly supplied from the red hematite mines in that part of the State. The production of these furnaces, however, has generally been very small and irregular.

There are 3 furnaces in Wayne County, working the red fossiliferous ore of that county.

In Norwich there is a furnace, but no ore is mined in that section.

In all, there are 24 charcoal furnaces now in operation, or that could readily be put in working order. One furnace is building. One, the Sterling Furnace, has recently been converted into an anthracite furnace; another (not now running) was turned into an anthracite furnace a few years ago. Nine furnaces were abandoned from 1854 to 1861, most of them about the time of the financial crash of 1857. One furnace was abandoned in 1866, but none from 1861 to 1866.

[The anthracite blast furnaces of the State are mostly on or near the Hudson River, between Troy and New York. Besides these, there are two (in operation) on Lake Champlain; one at Fort Edward; two in Orange County; one at Norwich (not running); one near Utica; and 4 at and near Buffalo.]

[*Dannemora Furnace* was situated in the State Prison Yard, Dannemora, Clinton Co. It was built in 1854, and burned and abandoned June 19, 1856. It worked magnetic ore from a mine within the inclosure. Convict labor was employed.]

(See *Forges*.)

FLETCHERVILLE FURNACE is 7¼ miles N. W. of Port Henry, Moriah, Essex County. Witherbees & Fletcher, owners. (S. H. & J. G. Witherbee and F. P. Fletcher.) J. B. Bailey, Agent and Manager.

Furnace was built in 1864–5, and blew in August, 1865. Stack is of stone; boiler-house, &c., of brick. Height of furnace 42 feet. Width of boshes 11 feet. Diameter of tunnel head about 4 feet. Has been running with 3 tuyeres, but recently 6 two-and-a-fourth inch tuyeres, three on each side, have been put in. Very warm blast at a pressure of about one pound is employed.

Gases are drawn off just below the tunnel head; there are two flues leading to the blast chamber, and one flue to the boilers. There are two double boilers on the top level; boilers are 42 inches in diameter, and 40 feet long; lower boilers 20 inches in diameter. Engine is horizontal, and piston rods of the two cylinders are continuous. Crank is at the far end of the steam cylinder. Piston rod does not run through the blast cylinder. Steam cylinder is about 20 inches in diameter; blast cylinder 64 inches. Stroke 5 feet. Fly wheel is 24 feet in diameter. Engine gives much satisfaction. No hoisting is required, as the furnace is on the side of a hill.

Ore is from a series of openings on the property of the company. It is transported on an average about one mile. The Company's mines are not yet opened to any great extent, but ore is abundant. At times, other magnetic ore is mixed with that on the property. Wood is cut from the woodland of the Company. It is hauled on an average about 1½ miles. It is burned in closed kilns at the furnace. There are 10 rectangular kilns capable of containing 65 cords each; product of coal is nearly 50 bushels to the cord (seasoned timber).

Furnace made in 13 weeks in 1865, 677 tons mostly foundry iron, consuming 1689 tons ore, 420 tons of flux, and 164,860 bushels of charcoal. During the blast, beginning December 12, 1865, and ending October 7, 1866, 1921¾ gross tons were made; average per week 44 tons 13 cwt. 3 qrs. 15 lbs. Furnace blew in again, December 27, 1866; average product per week to March 12, 1867, 76½ tons; flux used per ton of iron, 800 lbs. limestone, 200 lbs. clay.

Pig goes by wagon to Port Henry, 7½ miles; cost of transportation, in summer of 1866, $1.25. A considerable quantity of the iron is used for Bessemer steel at Troy.

CROWN POINT IRON CO. C. F. Hammond and E. S. Bogue. P. O. address, C. F. Hammond, Crown Point. Furnace is 10 miles west of Crown Point Landing, on Lake Champlain, Essex Co.

Furnace was built under the supervision of Jonas Tower, in 1845. It was burned down in 1863 (not in operation at the time) and immediately rebuilt and entirely restored.

It is 42 feet high, 10 feet across the boshes; has 6 tuyeres, 3 of 3½ inches and 3 of 1 inch diameter; blast is warm, and driven at a pressure of about ¾ of a pound by a steam engine of 15 inch cylinder and 5 feet stroke. Angle of boshes from top of hearth 55°. Height of boshes, 5½ feet. Diameter of tunnel head plate, 3½ feet.

The Company have been very successful in making iron. They generally make long blasts; the longest was 32 months. The general weekly product of the furnace is about 75 tons.

The annual product since 1854 has been as follows:

Made in - - -	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs.	3360*	3052*	3651*	3188*	3332	3202	3949	3381	3342	3373	2825	2430	2310

Capacity about 3900 tons. All the iron from this furnace is marked Crown Point, N. Y.

Iron is used chiefly for steel and for malleable iron. A large amount of it has been converted into Bessemer steel at Troy.

Ore is magnetic, from a mine ⅞ of a mile from the furnace. Ore dips at an angle of about 45°. Length of slope about 300 feet. Width of mine 90 feet. Thickness of vein about 11 feet. Steam is used for hoisting. Road from mine to furnace is on a descending grade. The Company own other mineral property.

Ore is roasted, stamped, and fine ore mixed with clay.

The limestone bed is 1 mile from the furnace.

Charcoal is made in kilns 4 and 6 miles from furnace. There is an abundance of wood within 6 or 7 miles of the furnace. The Company own an extensive tract of land. Charcoal cost in 1866 about 11 cents.

[*Adirondack Iron Works*, 48 miles west of Crown Point Landing, Essex Co., N. Y. This property, embraciug over 100,000 acres in one tract, and comprising some of the most extensive deposits of magnetic ore in the country, was purchased about 1830 by Messrs. Henderson, McIntyre & Robertson, under the title of the Adirondack Iron and Steel Company, and is still held by their heirs. The present representative of the parties is Mr. J. R. Thompson, of the Jersey City Steel Works. The mineral value of this property is treated of by Prof. Emmons in his report on the geology of this part of New York (Nat. Hist. Series). The ore is of great richness and purity. Blooms were made here direct from the ore about 1838 to 1840. A charcoal blast furnace was erected about 1848, and still stands, but is in ruins. It made iron up to about 1853. At first it was very small, but was subsequently enlarged, until it was probably 42 feet high and 7 feet across the boshes. The ore is refractory, and requires a high temperature and a high furnace. The Company put up a puddling furnace and a cupola furnace. In 1848 they built the Adirondack Steel Works in Jersey City. A new blast furnace was built on the property, and finished about 1854. It is 36 feet square, 48 feet high, and 11½ feet across the boshes, and cost $43,000. It made two blasts of about 6 months each, probably, in the years 1855 and 1856; about 1200 tons were made at each blast. It has been idle since. There is a puddling furnace and 2 centre lift water hammers at the works. The iron was shipped chiefly as hammered bar iron, and used at Jersey City. Some was shipped in pigs. The furnace and works are still in good condition, and are not permitted to be destroyed. The cause of abandonment of the manufacture of iron here was the difficulty of transportation. It had to be hauled in wagons 48 miles to Lake Champlain. The Saratoga and Sackett's Harbor Railroad is to pass near the works, and may perhaps run directly to them.]

[*Mount Hope Furnace* was abandoned about 1857. It was situated about 8 miles N. W. of Fort Ann Village, Washington County. It consumed about ½ Cheever magnetic, and ½ magnetic from the vicinity of the furnace.]

COPAKE IRON WORKS are situated at Copake Station, Harlem Railroad, Columbia County. Frederick Miles is owner.

Furnace was built in 1845. It is 32 feet high, 9 feet across the boshes, and has 2 tuyeres; warm blast is employed at a pressure of about 8-10 lb. Water power is generally used, but there is an engine in case of water failing. Engine is of about 12 inches cylinder, and 4 feet stroke.

Furnace went out of blast in 1856, and went in again in the summer of 1861. In 1865, about 2800 tons (gross) were made. In 1866, about 3387 tons were made.

Ore is from Copake mine, about ½ mile distant. It is a brown hematite, somewhat resembling the Salisbury ore,. It is sometimes mixed with other ores.

Limestone is hauled 1 mile, and charcoal averages about 8 miles.

About 2 2-5 tons ore, 130 bushels of charcoal, and 720 pounds of limestone are consumed to the gross ton of iron. Iron is used for car wheels, &c.

Furnace was formerly owned by Pomeroy & Son.

PHENIX FURNACE is 1½ miles N. E. of Millerton Station, Dutchess County. C. G. Maltby, owner. T. J. Houston, superintendent.

Furnace was built in 1847 by the Dutchess County Iron Company. The Company failing, the property was bought by Orville Dakin in 1851 or 1852, and the furnace was run by him for several years. It was sold again about 1857, and lay idle until 1865. It was purchased by George Morgan in 1860 or 1861, and sold by him to the present owner in August, 1864.

Furnace blew in November, 1865, and made, before the year closed, 451 tons. In 1866 it ran about 45 weeks, making about 2800 tons. Furnace is 33 feet high; 9½ across the boshes; warm blast at a pressure of about 7-10 lbs.; 2 horizontal blowing cylinders, about 5 feet diameter, and 5 feet stroke; engine has a 13-inch cylinder, and a 48-inch stroke; 2 boilers 30 feet long, 3 feet diameter, and two 15-inch flues each; height of bosh from beginning of batter, 6½ feet; height of crucible, 5 feet 11 inches; diameter of hearth, 2 feet 8 inches; diameter at top of crucible, 3 feet 8 inches.

Iron is used for car-wheels, malleable iron, &c. It is hauled 1½ miles to Millerton, and shipped to Taunton and Easton, Mass., Chicago, and other places.

Ore is chiefly from bed alongside of furnace; it is generally mixed with about one-fourth Old Hill ore, hauled 1½ miles. The Old Hill bed is in Connecticut. It is the original Salisbury mine, and is said to have been worked for 156 years. Its product for 1866 was about 14,000 (gross) tons. It goes to a number of furnaces in this section to be mixed with other ores. The ore is a brown hematite of great purity. The Phenix Furnace is the nearest furnace to the Old Hill Mine. The ore from the Phenix Mine closely resembles that from the Old Hill. Phenix bed is quite an extensive one. There is now considerable stripping. Coarse ore is roasted; fine is washed. There is an engine at the mine for washing. Mine was formerly called Maltby's Mine, and, at an earlier day, Dakin's Mine.

Use 2¾ tons ore, about 130 bushels charcoal, and 775 lbs. limestone to the (gross) ton of iron. Charcoal is hauled, on an average, about 11 miles, and has cost, on an average, for 1865 and 1866, about 18 cents. Flux is hauled about 2½ miles.

Furnace was formerly called Northeast Furnace.

MILLERTON IRON COMPANY was organized December, 1863. William H. Barnum, President. W. Phelps, Jr., Treasurer.

Furnace is the old Benedict Furnace, situated on the Harlem Railroad, 1 mile north of Millerton Station, Dutchess County.

The Company put the furnace into blast in the middle of December, 1864, after nearly rebuilding it. In 1865, the product was 3079 tons in 48 weeks, average over 64 tons per week. In 1866, the product was 2004 tons in 27 weeks, an average of over 74 tons a week.

Furnace was burned August 3, 1866, but went into blast again September 28.

Height of furnace 32½ feet; width of boshes 9½ feet; 5 tuyeres; temperature of blast low, perhaps 350°; pressure about 8-10 pound. Blast is driven by a horizontal steam engine, cylinder 16 inches, stroke of piston 42 inches. Two blast cylinders about 5½ feet diameter, and 5 feet stroke. Two boilers, 36 feet long, 42 inches in diameter, and each contain two 16-inch flues.

Ore used is about ½ Amenia and ½ Old Hill (both brown hematite). The former is hauled in wagons about ¾ mile from mine to Amenia Station, and brought by cars 9 miles, direct to furnace. The latter is hauled in wagons from mine 2½ miles. About 2½ tons of ore are used to the ton of iron.

Charcoal is hauled, on average, 11 miles; average cost, during 1865 and 1866, about 18 cents per bushel. About 140 bushels are consumed to the gross ton of iron.

Flux is hauled about 4 miles; about ½ ton of flux is used to the ton of iron.

Iron is used chiefly for car wheels and malleable iron. It goes to Chicago, Troy, Springfield, Worcester, &c. Freight to Troy (Dec. 1866), $3.85 per (gross) ton.

Furnace was originally built in 1854. It was out of blast for about 6 years, before the present Company took it.

WASSAIC FURNACE, Wassaic Station (Harlem Railroad), Dutchess County. Noah Gridley, owner. John A. Beckley, lessee.

Furnace was built in 1826. It is 32 feet high, 9 feet across boshes, and has 2 two and three-fourth inch tuyeres. Warm blast is employed. It is driven by an overshot wheel of about 22 feet in diameter, and 6 feet face. There are 2 blowing cylinders of about 5 feet stroke and 5 feet diameter. Water privilege is fair.

Ore used is sometimes Amenia brown hematite alone, and sometimes mixed with other brown hematites. A part of the Amenia bed is owned by Mr. Gridley. About 2¼ tons of ore, ½ ton of limestone, and 150 bushels charcoal produce one gross ton of iron. Flux is hauled about 5 miles, and costs about $2.50 per gross ton. The average distance charcoal has been hauled during the past four or five years has been about 3 miles, costing on an average, say 13 cents per bushel. It now costs more. Yield of furnace about 30 gross tons per week.

Iron is of all grades. It has been used for car wheels, chilled rolls, machinery, cannon, &c. It goes to different sections of the country.

[*Dover Furnace* was abandoned about 1857; it was situated near South Dover (Harlem Railroad), Dutchess County. It occasionally used a small quantity of anthracite with its charcoal. Furnace was built in 1835, and went into blast March, 1836. William A. White was the owner.]

DUTCHESS COUNTY IRON WORKS, ¼ of a mile from Harlem Railroad, and 4 miles south of Dover Plains, Dutchess County. W. T. Sears, President; D. B. Martin, Manager.

Furnace was built in 1847. It was owned by William A. White, and sold to present Company in the spring of 1864. It is 34 feet high, 9 feet across the boshes; warm blast at a moderate pressure is driven through two 3-inch tuyeres; power is furnished by an overshot water-wheel of 28 feet in diameter, and 6 feet bucket. There are two wind cylinders. Water privilege is fair. Furnace makes about 5½ tons per day on an average.

A second stack was commenced near the first one, but was left unfinished.

Ore is brown hematite, brought in wagons about 2 miles. Ore bed is owned by the Company. Charcoal is hauled about 8 miles on an average, and cost in the fall of 1866 about 15 cents per bushel. Limestone is hauled about one mile. It is from a marble quarry; 2½ tons ore, 1100 lbs. flux, and 155 bushels charcoal are consumed to the gross ton of iron.

Iron is used for malleable iron and car wheels.

Freight to New York in fall of 1866, $3.00 per ton.

White's Dover was the name formerly given to the furnace.

BEEKMAN FURNACE is situated in the north part of the town of Beekman, Dutchess County. It is 14 miles east of Poughkeepsie. It has been owned by Sterling, Foster & Co. since 1855.

It was built in 1830. It is 34 feet high, 9 feet across the boshes; has 3 two and a half inch tuyeres. Blast is warm and driven by means of an overshot wheel 16 feet in diameter, and 5½ feet bucket. Warm blast was introduced in 1838. Furnace is not now in blast (Jan. 1867).

Ore is brown hematite from Clove Ore Bed, about 2 miles distant. Charcoal is hauled on an average about 9 miles. Flux is obtained near by.

HOPEWELL FURNACE, formerly called Fishkill Furnace, is situated at Hopewell, East Fishkill, Dutchess County, about 9 miles E. N. E. of Fishkill Village, and 14 miles from Fishkill Landing.

Furnace is owned by James Emett, of Poughkeepsie, and leased by Gilbert Niver, J. G. & William S. Dudley, who propose to call themselves the Fishkill Iron Company.

Furnace is about 38 feet high; 9 feet across the boshes; has 3 tuyeres. Water privilege is good; head is 23 feet; a turbine wheel is employed. Blast is warm.

Ore is brown hematite from the Clove Bed near the Beekman Furnace. It is hauled 10 miles. There is a bed of inferior hematite near the furnace. Clove ore is washed, but not roasted; 2¼ to 2½ tons ore yield 1 ton iron.

Charcoal is hauled on an average about 8 miles, and costs 14 cents. At one time, a small quantity of anthracite was mixed with the charcoal.

The furnace went into blast in the early part of December, 1866, employing *peat* mixed with the charcoal. The peat bed is about 4 miles from the furnace; the use of peat is an experiment. If successful, the furnace will probably make a blast of three or four months, and then go in again next fall (1867). Peat is prepared by spreading on the ground, cutting into blocks and exposing the blocks as they stand on end, or in piles, to the heat of the summer sun. There is now no artificial heat used in drying, and no pressing. So far the result of the experiment is considered satisfactory, ½ peat is used with success. Peat must be quite dry. (Feb. 1, 1867.)

GREENWOOD IRON WORKS. R. P. & P. P. Parrott. Works comprise an anthracite and a charcoal furnace: the former situated on the Erie Railway at Greenwood Station, the latter three-fourths of a mile back; Monroe Township, Orange County.

The anthracite furnace is 55 feet high and 15 feet across the boshes. Blast is employed at a temperature of about 450° or 500°; and driven at a pressure averaging perhaps 4½ lbs.

Power is furnished by two engines and one water wheel. The latter is a reaction wheel of little power; it aids somewhat in blowing, running two horizontal cylinders. The cylinders, however, are left open at one end as the wheel has so limited a power. One of the engines is uncovered; it is seldom run except when the main engine is stopped. It is horizontal, and has two fly-wheels; its cylinder is of about 30 inches diameter, and 36 inches stroke. The principal engine is horizontal; it has a cylinder of about 24 inches in diameter, and 6 feet in stroke. It has two blowing cylinders of 5 feet diameter, and 6 feet stroke. Steam is furnished by three cylindrical boilers 3 feet in diameter, and 112 feet long,

Furnace is in the side of a hill. Ore, coal, and limestone are raised on a platform on a slope by a small vertical engine; platform holds 4 barrows, and there is a rachet arrangement to prevent accidents. Coal comes on the Erie Railway, and the cars are drawn up a long slope by a wire rope; the object is to get a sufficient height to allow the coal to be dumped. Coal is from Pittston. Limestone is hauled in wagons about one mile.

Ore yields in furnace 45 per cent.; two and one-eighth tons coal, and 1600 lbs. of limestone are consumed to the gross ton of iron.

Product of furnace has been as follows:

Made in . . .	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs.	2800	5600	3360	4738	951	00	00	00	00	4457	4824 in 28 w'ks.	3169 in 21 w'ks.	3047 in 21 w'ks.

Capacity is about 9000 tons.

The local name given to the furnace is the Clove Furnace. Iron has great tenacity.

The Greenwood charcoal furnace is about ¾ of a mile northeast of the anthracite furnace. It was built in 1813; is 12 feet high; 10¾ feet across the boshes; has three 3-inch tuyeres; blast is warm. Power is furnished by an overshot water wheel 30 feet in diameter, and 5 feet bucket. Water privilege is fair. Furnace has a fire-brick hearth, and a water temp.

Blasts average about one year. Yield of furnace is about 30 gross tons per week.

About 2⅝ tons ore, 170 bushels or more of charcoal, and 200 lbs. limestone are consumed to the gross ton of iron.

The furnace formerly ran without any flux.

Ore is roasted in a perpetual kiln, located not far from the furnace. The kiln is nearly cylindrical, about 6 feet in diameter, and about 29 feet high. Roasted ore is stamped. The 16 stampers are driven by a Finley wheel.

Charcoal is hauled, on an average, about 7 miles.

The iron made at this furnace has great tenacity; a very large proportion of it is used for Parrott guns.

The product of the furnace, in 1865, was 734 tons made in 37 weeks. In 1866, 1427 tons were made in 44 weeks. Iron is marked G. W.

There are about 9000 acres of ground attached to the furnaces. Upon this tract are a number of openings from which ore has been taken. The region is metamorphic, and the ore magnetic.

The mine from which the largest amount of ore has been taken is the O'Neal Mine. It has been worked for about fifty years, and is an extensive open quarry; a very large amount of ore has been taken out. The opening is about half a mile long, and, in places, as much as 200 feet wide, and about 60 feet deep. It is not one vein, but a collection of small irregular veins, hence much rock is mined with the ore. The amount of ore does not seem to increase downwards, and the mine being in a low situation, there is considerable trouble from water. The ore is expensive and rather lean, but valuable, as it gives great tenacity to the iron made.

The Bull Mine is the most promising opening. It is a vein of a width varying from 6 to 18 feet. It dips to the east at an angle of about 50°. It is opened by a horizontal tunnel about 200 feet long. Ore contains some sulphur. It is hauled in carts about 2 miles to Oxford Station, and thence goes by cars 7½ miles to Greenwood. About 3800 tons were mined in 1866.

The Bradley Mine is about 2½ miles from Greenwood.

There are a number of other openings on the property.

The Warwick Mine is in Warwick township. It is partly owned by P. P. Parrott. It is decidedly red short, but makes a good forge iron when mixed with the other ores of the section.

STERLING IRON AND RAILWAY COMPANY own about 22,000 acres of land in Orange County. The tract is chiefly embraced in the townships of Warwick and Monroe, and adjoins the New Jersey State line. Five hundred acres are in the State of New Jersey. The property is mostly woodland; it is rocky and not suited for cultivation, but is rich in magnetic iron ore. The Sterling and Southfield Furnaces are situated upon the property. Almost the only inhabitants are those connected with the mining and the working of the ore.

This tract of ground was owned for a number of years by Townsend & Brothers; a large portion of it having been taken up by them, when the removal of the New Jersey State line transferred it to the State of New York. The present Company purchased it from the Messrs. Townsend in the spring of 1864 (taking possession April 1).

The mines have been known for a great many years, and a charcoal blast furnace was run here for some time before the beginning of the century. It was one of the first blast furnaces in America. It was located near the Sterling Mine, and was abandoned about 1805.

A furnacc was built at Southfield about 1806; wind was furnished by a pair of bellows, and the quantity of iron made was, of course, small. It was rebuilt in 1838-9, and is still running. It went into blast in the fall of 1839.

The Sterling Furnace was built in 1848, and converted into an anthracite furnace in 1865-6.

The general offieers of the Sterling Iron and Railway Company are J. Dutton Steele, President, N. Y., and A. W. Humphreys, Secretary and Treasurer, N. Y.

After purchasing the property in 1864 the Company commenced at once the construction of a railroad from a polnt on tlie Erie Railway, a short distance below Sloatsburg, to the Sterling Mine and Furnace. For this purpose, the Sterling Mountain Railway Company was organized. It has the same general officers as the other Company. T. C. Steele, Sloatsburg, is the Superintendent of the Railway, and mining of ores for sale. The railway was in operation before the close of 1865. It has now, with its sidings, &c., about 10 miles of track. It is about 4½ miles from the Junction to Sterling Furnace, and about 3½ more thence to the Sterling Mine. The total actual investment in property, railway improvements, conversion of Sterling Charcoal Furnace into an Anthracite Furnace, &c. &c., stands about $1,500,000. Tbe chief business of the Company is the sale of the ore.

The property has not been thoroughly explored, but a large number of mines have already been opened. The principal one is called the Sterling Mine. It is a vein (improperly so-called) of magnetic iron ore covering the side of a hill, and absolutely bare over an extended surface. Thickness of this sheet of ore is variable, and has not been determined; it is known, however, to be very thick. The foot wall has been exposed only at one place, and appears to be in rolls. The quantity of ore is immense. A few rods from the main Sterling Mine is another opening known as the Lake Mine, and a few rods further a third opening. It is thought that these are the croppings out of *veins* (so-called) parallel with the main vein and underlying it. These veins, where exposed, are very heavy, and if the inference of a series of parallel veins is correct, the quantity of ore is beyond computation. The hills, or rather ridges, in this section are all monoclinal. (?)

The characteristic of the ore from the Sterling Mine is cold shortness, and on this account it is very valuable for mixing with red short ores. The demand for the ore is large and rapidly increasing.

The ore from the Lake Mine is less cold short than the Sterling proper ore. It is very rich and quite refractory, and hence has been used with success in puddling furnaces. The mines are on the shore of a lake of about 350 acres.

The two mines above named, supply most of tbe ore sold by the Company. In 1866, about 55,000 tons of ore were sold, and in 1867, it is probable, that nearly, or quite 100,000 tons will be disposed of in this way.

A considerable quantity of the ore is used in the Schuylkill Valley. Ore is delivered by Company at Piermont on the Hudson. Average price at which ore was sold at Piermont in 1866, $5.00 per gross ton.

There are a number of other mines on the property, among them the most important at present are the Moorhead (ore decidedly red short); Crawford (similar to Sterling, cold short); Cooke (nearly neutral), and Augusta (near the last named and similar). The product of these mines supply the two furnaces.

SOUTHFIELD FURNACE is situated about a ½ mile from Southfield Station, Erie Railway. Chas. F. Ford, Jr., is the manager of the furnace.

Furnace is 41 feet high, 12 feet across the boshes. Blast is warm and driven at a pressure of about one pound through three 2-inch tuyeres. Power is furnished by an overshot wheel (new) about 24 feet in diameter, and 6 feet bucket. There are two horizontal blowing cylinders 4½ feet in diameter, and 6 feet stroke. Water privilege is good. Blasts average about two years. Product is about 47 gross tons per week.

Ore used is chiefly from the Augusta and Cooke Mines, 6 miles by wagon from the furnace. Cbarcoal is hauled, on an average, about four miles; it cost about 12 cents per bushel (cut on the property of the Company) in 1866. It is burned in pits.

Two and a half tons ore, 400 lbs. limestonee, and about 130 bushels of charcoal are used to the gross ton of iron. Formerly, no flux was used; now, limestone is brought from Sing Sing. It is transported by water to Piermont, thence to Southfield by Erie Railway.

Iron made is very tenacious. Most of the first growth of timber on the property has been cut off, and formerly very little care was taken of tbe second growth, and a part of the land was burned over; hence, the second growth is still small. Care is now taken of it, and it is advancing,

The product of the Southfield Furnace has been as follows:

Made in - - - - -	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs. - -	2276	647	00	00	00	1542	2064	00	1822	1131	2415	1805	2464

Its capacity is about 45 to 50 gross tons per week.

The longest and largest blast ever made by tbis furnace commenced October 11, 1850, and ended July 3d, 1853; 2 years, 8 months, and 22 days. During this blast there was a remarkable stoppage of the furnace for want of water and for repairs. In consequence of a failure of water,—partly caused by neglect,—the blast was off for one month and sixteen days. The furnace bridged over, it was cleancd out below, filled in with charcoal from below, a hole was made in the bridge and stock let down. Furnace afterwards worked well. There were subsequently several short stoppages for want of water, in all amounting to 16 days. The running time was, therefore, 2 years, 6 months, and 20 days, and made 6353½ gross tons. The furnace, during this blast, had a stone hearth.

Sterling Furnace is about 4 miles from Sloatsburg. The Sterling Mountain Railway passes near to the furnace and has a track running to it. Chas. F. Ford, Manager. Furnace went into blast with anthracite about February, 1866.

Product of charcoal iron, for former years, was as follows:

Made in - - - -	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs. -	2680	2619	2144	2274	2905	2539	2817	2701	2320	2849	2248	674	00

Product of anthracite iron, 1866, was 5098¾ tons.

Furnace is 42 feet high, 12 feet across the boshes; blast is driven through three 4-inch tuyeres at a pressure of about 5 pounds, and at a temperature of about 500°. When charcoal was used, blast was driven by water-power. The water-wheel has now been replaced by a horizontal engine having a 32-inch cylinder, and a 6 feet stroke; there are 2 fly wheels, 20 feet in diameter, and weighing about 14 tons each. Steam is supplied by 5 boilers, 50 feet long and 30 inches in diameter. They are about 10 feet below the tunnel head. Arrangements are very neat.

Furnace produces a tough close-grained iron. Product is about 110 gross tons per week.

Ore is from the Moorhead, Crawford, and Cooke Mines. Moorhead is transported 4 miles by wagon; Crawford ½ mile by wagon, and Cooke 2 miles by wagon, and 3½ by rail. Ore cost, in the fall of 1866, on an average, about $2.50 per ton. Coal is from the Pennsylvania Coal Company. It cost in December, 1866, $7.40 per ton. Sing Sing limestone comes by rail from Piermont; 2½ tons ore, about 1 ton 18 cwt. coal, and 1100 lbs. limestone, produce 1 gross ton iron.

[*Brasher Furnace* was situated about 8 miles northeast of Brasher Station, St. Lawrence County. It was built in 1835, and worked a bog ore from Bombay Township, Franklin County. It was burned in 1844, and again July, 1856. It has not been in blast since the latter date. Isaac W. Skinner, of Ogdensburg, was the owner.]

MYERS STEEL AND IRON COMPANY. Charles G. Myers, President (Ogdensburg). George R. Myers, Secretary. Capital, $250,000.

The Clifton Iron Company, of Boston, are the owners of about 23,000 acres of land in Clifton Township, St. Lawrence County. This property is rich in magnetic iron ore, and the Company propose to do business chiefly by selling ore. A considerable quantity of the ore has been worked at Fullersville Furnace and elsewhere. It is a rich and fine ore, supposed to be suitable for steel.

The Myers Steel and Iron Company have secured from the Clifton Iron Company for a term of years, the right to manufacture iron upon their property, taking their ore and wood at specified rates. The Myers Company is building a charcoal warm blast furnace, with corner timbers in the Lake Superior style. It is to be 40 feet high, and 9 or 10 feet across the boshes. Water-power will be employed. The blast is to be warm, and three tuyeres are to be used. Furnace will be in operation, it is expected, in the summer of 1867.

Furnace is located two miles from the mine, and there is a down grade to the former. Timber is abundant. It is expected that charcoal will cost about 6 cents per bushel.

The furnace is 20 miles southeast of De Kalb Junction, and the Clifton Iron Company have entered into a contract for the construction of a tram road to that place, to be completed August, 1867.

COOPER'S FALLS IRON COMPANY. J. W. Lowden, Agent. Furnace is situated on the line of the Ogdensburg and Watertown Railroad, 3 miles west of De Kalb Junction, St. Lawrence County, New York. P. O., De Kalb.

Furnacc was built in 1865. It is 34 feet high, 10 feet across the boshes, has two 2½-inch tuyeres; blast is cold and driven by water-power at a pressure of about a half pound.

Ore is a rich red hematite. It is hauled 5 miles. Limestone is obtained close to the furnace. Charcoal is hauled from 1 to 7 miles.

About 12 hands are employed at the furnace.

Iron is used for foundry purposes and for chilling.

In 1866 furnace ran 7 weeks and produced 255 tons of iron from 463 tons of ore; 1 ton of flux is used to about 10 tons of ore.

Capacity of furnace is 2500 tons.

ROSSIE IRON WORKS, Rossie, St. Lawrence County. Samuel W. Torrey, of New York, President; Robert Gordon, of New York, Secretary; Benjamin F. Butler, of New York, Treasurer, and Charles R. Westbrook, Superintendent.

The village of Rossie is in the township of the same name, 14 miles N. N. W. of Antwerp, and 12 miles N. W. of Keene. The latter is the nearest railroad station.

The furnace and property belonging to it were owned for many years by George Parrish, who held an immense tract of land in this section. He is still a very large landowner, and also holds the mineral right of a great deal of property owned by other parties.

The present Company purchased in the fall of 1864.

The furnace was built about 1805, and rebuilt in 1846. It went out of blast in 1855, and remained idle until December, 1865. The shape of the furnace was changed in the summer of 1866.

Furnace is 43 feet high, 9 feet across the boshes. Warm blast at a pressure of 1½ to 3½ pounds is employed. It is driven through two 4½-inch tuyeres. Power is furnished by an S (Scotch motor) wheel of about 50 horse-power. Water privilege is good; the head is 16 or 18 feet. The recent alteration in tbe shape of the furnace has changed the angle of the boshes, and, it is believed, has caused a very large increase in the yield. The furnace is now similar to the Morgan and Greenwood Lake Superior Furnaces. It has very steep boshes (about 80°), and only a slight angle between the crucible and boshes. The yield of the furnace since the change has been remarkable; 101 gross tons of iron were made in a single week at an expenditure of 112 2-5 bushels of charcoal to the ton.

Ore is from the Keene and the Old and New Caledonia beds, which are owned by the Company. The Caledonia Mines are close together, and the Keene is only about 1 mile distant. The mines are about 12 miles S. E. of the furnace. They are all near to the railroad, and the Old Caledonia is immediately alongside, and has a track running into it. Adjoining the New Caledonia is the Kearney Mine owned by other parties; there are several other mines in the same section.

These mines yield red hematite ore, and are on the border of the great azoic region of Northern New York. The ore lies on the azoic rock, and often has a capping of Potsdam conglomerate. The mines are open quarries. The ore is hard and requires blasting.

The Keene bed has been worked quite extensively. The Old Caledonia Mine presents a fine breast of ore. Tbe ore is assorted by hand, rock being mixed through it. The Keene bed contains less rock. The New Caledonia has not been worked very extensively. It

is said to be very free from rock. The ores are similar to the Lake Superior red oxide, but not quite so rich.

The Company are beginning to sell ore, and hope to compete with Lake Superior ore for the Western New York and Ohio Furnaces.

The Rossie Furnace is badly located, ore being hauled by wagon 12 miles. Formerly, the ore was roasted and stamped. It is now used raw, and put through a Blake's crusher. The crusher is run by an S wheel.

To give additional tenacity to the iron, a small quantity (about 5 per cent.) of magnetic ore containing titanium from the Rideau River, back of Kingston, Canada, is used. It is landed at Chippewa Bay, and hauled 9 miles thence by wagon to the furnace.

Charcoal is hauled, on an average, about 4½ miles, and cost in the spring of 1867 about 11 cents; about 125 bushels are used to the gross ton of iron. Limestone is used for fluxing; about 2 tons of ore yield 1 ton of iron.

Not far from the Rossie Furnace are two galena mines. Rossie township is very remarkable for the variety of its minerals.

[*Fullersville Iron Works* are situated about 9 miles S. E. of Gouverneur Station, St. Lawrence County, on the south side of the Oswegatchie River. The works comprise a blast furnace and a forge. The former has been out of blast since about 1857, and will, probably, never run again. The forge is a small concern, and is still running. (See *Forges*.) The works were owned and occupied by Messrs. Fuller Brothers & Co. for many years previous to 1861, when they failed. The furnace, and a portion of the property, were purchased in 1864 by Chester H. Sprague.]

[*Wegathie Furnace* was situated 7 miles north of Antwerp, Jefferson County. It was owned by Jas. & A. P. Sterling. It was built in 1846, and abandoned in 1857. It used Sterling red oxide. (See *Sterling Iron Works*, below.)]

REDWOOD FURNACE. J. C. Sardam, owner, Redwood, Theresa township, Jefferson County. Redwood is 15 miles nearly north of Philadelphia, and 7 miles south of Alexandria Bay.

Furnace was built in 1847. It is 30 feet high, 8 feet across the boshes. Blast is warm. There are two 2½-inch tuyeres. Power is furnished by a breast wheel of 24 feet diameter and 8 feet face.

Ore is about four-fifths red oxide, transported in wagons 12½ miles, and one-fifth Canada magnetic, transported 40 miles by water, and 7 by wagon, from Alexandria Bay.

Charcoal is obtained within about 4 miles of the furnace. Limestone is quarried near by. About 12 men are employed at the furnace.

[*Sterlingburgh Furnace* was situated 1½ miles east of Antwerp, Jefferson County. It was built in 1846, and abandoned in 1857. It was owned by Jas. & A. P. Sterling. It used Sterling red oxide. (See *Sterling Iron Works*.)]

STERLING IRON WORKS. Mrs. A. Sterling, owner; James Sterling, agent and superintendent; R. H. Sterling, founder; Sterlingville, Jefferson County.

Furnace was built in 1837. It is 30 feet high, 8½ feet across the boshes; tunnel-head about 20 inches in diameter; blast is cold; it is driven through one 3-inch tuyere; power is obtained by means of a breast-wheel of 20 feet in diameter, and 12 feet face. Water privilege is fair. Product is about 4 tons per day. Iron is used for car-wheels and other purposes; it is shipped from Philadelphia, the nearest railroad station, which is 4 miles west of the furnace.

Furnace was out of blast from 1858 to 1862, inclusive. In 1863, it produced 780 tons; in 1864, 720 tons in 31 weeks; in 1865, 1098 tons; and in 1866, 700 tons.

Ore is about seven-eighths Sterling, and one-eighth Shurtleff. They are both red oxides, the former yielding about 50 per cent., and the latter 33 per cent. About 2½ tons of ore yield 1 ton of iron. Sterling ore is hauled 11 miles; Shurtleff, 7 miles. The Sterling mine is owned by the Sterling family. The Shurtleff ore is purchased for mixing, as it renders the ore more readily reduced; it contains considerable limestone.

Limestone is hauled about 5 miles; charcoal is hauled 4 miles on an average. It costs about 7½ cents. About 150 bushels are used to the ton of iron. In mining, furnace, teaming, &c., about 100 men are employed.

The Sterling mine is an extensive open quarry. It has been worked for many years. The quantity of ore is very great. The stripping is not heavy. There is some rock through the ore, which, however, is readily separated by hand. The mine is in the town of Antwerp. It is about 2 miles from the line of the railroad, and about 4 miles from Antwerp station. The ore is similar to that of the other mines in this section; it is rich. In 1866 the ore only went to the Sterling Iron Works and the Sterling Bush Furnace. Probably about 5000 tons were mined. Some twelve years ago the product of the mine was 10,000 or 15,000 tons.

The mine has been worked for a number of years. It was owned by James Sterling. He built and at one time ran 4 furnaces in this section. In 1857 he failed, and the Wegatchie and Sterlingburgh Furnaces were abandoned. He died in 1861, leaving several sons, who now run the furnaces at Sterlingville and Sterling Bush. The mine, the two furnaces, and considerable property are still held by the family.

CARTHAGE IRON WORKS. Cole & Allen, owners; J. C. Budd, agent; Carthage, Wilna Township, Jefferson County.

Furnace was built about 1819. It went out of blast about 1850, and did not go in again until the spring of 1865.

Furnace is 30 feet high, 9 feet across the boshes; blast is warm; there are two 2½-inch tuyeres; blast is driven by water-power; an undershot wheel of 21½ ft. diam. and about 8 feet face is employed; privilege is good.

Ore used in 1866 was from the Shurtleff bed, hauled 17 miles by wagon. It is a red oxide, yielding about 42 per cent. in the furnace. There is some limestone in the ore. Additional limestone for fluxing is obtained near the furnace. Charcoal is hauled on an average about 4 miles.

Ore cost in the furnace bank (Feb. 1867) $5.25 per ton. Charcoal 8 cts. per bushel.

2½ tons roasted iron, 150 bushels charcoal, and about 200 lbs. limestone are consumed in making 1 net ton of iron.

The furnace was taken by the present owners in the spring of 1864. It was then in a very dilapidated condition, having been out of blast for so many years. It was repaired, new machinery put in, &c. Product of furnace in 1865, 637 tons; in 1866, 759 tons. The tensile strength of No. 1 pig made at this furnace and tested at West Point Foundry was 20,769 lbs. to the square inch.

The hearth is made of Potsdam sandstone. The lining of the furnace is of a stone found within a mile of the furnace, and called *locally* a fire limestone. It contains a large proportion of sand, and is probably calciferous sand-rock. It has been used ever since the furnace was built. It wears very well as long as the hearth lasts, but slacks when cooled off, and has to be renewed whenever a new hearth is put in. Lining costs $250. Blasts are short.

STERLING BUSH IRON WORKS. A. P. Sterling, Lessee, Sterling Bush, Diana, Lewis County.

Furnace was built in 1837. It is 30 feet high, 9 feet across the boshes; has one 2¼-inch tuyere; blast is cold, and driven by means of a breast-wheel about 18 feet in diameter and 9 feet bucket. Water privilege is good.

Ore is from the Sterling mine. It is hauled 11 miles in winter, and 14 in summer; it is mixed with one-tenth Shurtleff ore, hauled 16 miles. Both these ores are red oxides. (See *Sterling Iron Works*, above.)

Charcoal is hauled 2 to 4 miles; limestone about ½ mile.

Furnace is situated about 12 miles S.S.E. of Antwerp, which is the nearest railroad station, and 9 miles E. of Sterlingville.

This furnace is one of several built by James Sterling.

ALPINA FURNACE, Lewis County, 16 miles southeast of Antwerp. Z. H. Benton, owner.

It is a handsome stack of cut sandstone. It was built in 1846. Furnace is 32 feet high, 9 feet across the boshes; either warm or cold blast can be employed. Power is furnished by a breast-wheel.

Furnace went out of blast in 1856, and has not run since, with the exception (?) of a short blast made about the year 1859.

Ore used was magnetic, from the Jayville bed, 7 miles northeast; and red oxide from the Kearney bed (north of the Caledonia beds on the railroad) 15 miles northwest of the furnace. Both by wagon.

PORT LEYDEN IRON COMPANY. H. D. H. Snyder, President; Charles H. Sayre, of Utica, Secretary, Port Leyden, Lewis County.

There are two furnaces, which were built in 1864–5. One of them went into blast in the spring of 1865. The other has not yet been used. The stacks are together; they are built of limestone. There is one casting-house for the two; it is 60 by 70 feet. The stacks are well built, and in excellent condition.

One of the furnaces is 37 feet high, and the other is 33. They are 9 feet across the boshes. They have each three 2½-inch tuyeres. Blast is warm, and driven at a pressure of about seven-eighths of a pound. Power is furnished by 2 Tyler wheels, of 42 inches in diameter. There are 2 blowing-cylinders for each furnace. They are of 40-inch diameter, and 5½ feet stroke. Water privilege is very fine, as the Company have the control of all the water in the Black River. The fall is 22 feet.

The furnaces are on the Black River Canal. The Utica and Black River Railroad will pass close to them. It will probably be completed so far by the summer of 1867. The nearest railroad station is now Booneville, 7 miles. Freight all goes by canal. Freight to New York on pig iron in November, 1866, was $5 per ton. Port Leyden is about 42 miles from Utica, and 141 from Troy.

Charcoal is hauled on an average about 3 miles. It cost, in December, 1866, about 10 cents per bushel. Wood, cut 2½ miles from the furnaces, cost, at the same time, $1.37 per cord.

Limestone is obtained near by.

There is an extensive bed of magnetic ore near the furnace. This ore, however, contains both sulphur and phosphorus, and has not thus far been used with success. It is not used at all at present.

Ore now used is the Clinton fossil ore, transported 51 miles by canal, and costing (November, 1866) about $5 per ton; and Port Henry magnetic (transported by water), and costing $9 per ton. Ore is roasted.

Iron is used for foundry purposes.

It is now proposed to make car-wheel iron, and use hematite ore from east of the Hudson River.

[*Taberg Iron Works*, Taberg (11 miles northwest of Rome), Oneida County.

The Oneida Iron and Glass Manufacturing Company was organized in 1809, and commenced work in 1810. The Taberg Furnace was built in 1809. For about 20 years from this date, kettles, hollow-ware, &c., were made, but no pig. From that time pig was the chief product. The Company never made glass. The charter ran out in 1860, and the furnace was taken by E. B. & H. S. Armstrong, who were large stockholders. They had run it since about 1835. The furnace went out of blast in the early spring of 1866, and as charcoal is becoming scarce, will probably not go in again. Furnace was rebuilt once or twice. It is 32 feet high, 9 feet across the boshes; blast was warm, and driven by water power. Water privilege small, but good. An overshot-wheel, 22 feet in diameter, and 16 feet face, was employed.

Previous to 1860, charcoal cost about 5 cents per bushel. It subsequently cost 8, 9, and 10 cents. About 140 bushels were used to the gross ton of iron. Charcoal was hauled, for the last six years, about 4 miles on an average. Ore was four-fifths Clinton, one-tenth magnetic, and one-tenth Verona. Clinton (fossiliferous) was transported by canal to Rome, and thence 11 miles by wagon to furnace. Magnetic ore was from Lake Champlain. It came likewise to Rome by water. Verona ore was hauled about 10 miles by sleigh, or wagon. It was used chiefly as a flux, as it contains only about 20 per cent. of iron.

Iron was used chiefly for foundry purposes.]

[*Constantia Furnace* was situated at the village of Constantia, on the north shore of Oneida Lake, Oswego County. It was about 20 miles from Syracuse. It worked Clinton fossiliferous ore from southwest of Utica. It was abandoned about 1858. It was very old, having been in operation as early as 1812.]

NORWICH BLAST FURNACE, on the bank of the Chenango Canal, Norwich, Chenango County,

Furnace was built in 1855–6. It is 32 feet high, 9 feet across the boshes; has 2 three and a half inch tuyeres; blast is warm, driven at a pressure of about 2 lbs. by a steam engine of 18 inch cylinder and 4 feet stroke.

It made about 1200 tons of iron in 1863; about the same in 1864; 2000 tons in 1865, and 1800 tons in 1866. It ran in 1864, 28 weeks; in 1865, 36 weeks; and in 1866, 36 weeks.

Iron is used chiefly for car wheels and malleable iron. The larger proportion of it is used in the car-wheel works of the Messrs. Scoville, in Buffalo, and Toronto (Canada).

Ore is brown hematite from the Salisbury and neighboring groups of mines (Amenia, Old Hill, Copake, Dakins, Richmond, &c.). It is transported by land to Hudson, and thence by water to the furnace. Distance, Hudson to Norwich, about 200 miles. About 2½ tons ore make 1 ton iron.

Flux is limestone.

Charcoal is obtained at from 4 to 14 miles from the furnace. In 1866, about 240,000

bushels were consumed. Some wood is used in the furnace. In 1865 and 1866, about 600 cords hemlock, cut in 4 feet lengths, were consnmed each year.

The furnace was built by Andrews, Rider & Co. It was sold to Andrews & Scoville in 1863. The present owners are B. B. Andrews, of Norwich, John and N. C. Scoville, of Buffalo.

(*Norwich Iron Works*, Norwich, Chenango Co. On Chenango Canal, about ½ of a mile south of Norwich Blast Furnace.

Furnace was built 1855–6. In 1863, it was converted into an anthracite furnace, and made a blast with anthracite in 1864. Since that hlast it has been idle.

It is 34 feet high, 10½ feet across the boshes, and has 4 tuyeres.

Ore used was chiefly from Oneida County. It is the Clinton fossiliferous ore. It was transported by water 40 miles. Other ore was used for mixing. Anthracite is transported 40 miles by canal.

Furnace is owned by W. M. Conkey.)

WOLCOTT FURNACE is situated on Wolcott Creek, about 1½ miles N. of Wolcott village, Wayne County.

It was huilt in 1821.

Wise & Carman, owners. Jas. H. Gould, lessee. J. R. Wagner, Agent. Furnace is 35 feet high and 9 feet across the boshes. Blast is warm and driven through 2 tuyeres. Water power is employed. Ore used is fossiliferous. Loam is used for fluxing. Furnace was out of blast during 1865 and 1866.

ONTARIO FURNACE is owned and operated by A. J. Bixby. It is situated at Ontario village, Wayne County, about 2 miles south of Lake Ontario, 22 miles northeast of Rochester, and 13 miles north of Palmyra, the nearest railroad station.

Furnace was built in 1825. It is 30 feet high, 7¼ feet across the hoshes; has two 2½-inch tuyeres; blast is warm; power is furnished hy a steam engine of 10 inch cylinder, and 36-inch stroke.

Ore is red fossil from mines owned hy the furnace. It is hauled on an average about 1½ miles. It was formerly sometimes mixed with Lake Superior ore. No limestone is required, as the ore contains a large proportion of that substance. A small quantity of clay is occasicnally used. It is obtained about 1 mile from the furnace. Charcoal is obtained on an average ahout 5 miles from the furnace. It costs about 12 cents.

There is a large quantity of peat in this section, and it is proposed to use it as a fuel, mixed with charcoal. Charcoal is scarce, and the furnace did little or nothing in 1865 and '66. It is proposed to begin taking out peat in the spring (1867). Iron made goes to Rochester. It is sold for stove-plate iron, &c. Hauling to Rochester cost, in 1864, about $3 per ton. Value of products that year, about $32,000.

Furnace has changed hands several times.

CLINTON FURNACE is situated in Ontario Township, Wayne Co., 3 miles south of Lake Ontario, and 13 miles north of Palmyra, which is on the Central Railroad and Erie Canal. The furnace is 18 miles from Rochester. It is about 1 mile from Ontario Furnace. Palmyra is the nearest railroad station. Jas. H. Gould, owner, Rufus Sweeting, Agent.

Furnace was built about 1847. It is 35 feet high, and 10 feet across the boshes. blast is warm; power is furnished by an engine of 12-inch cylinder and 36-inch stroke; there are three 2½ to 3½-inch tuyeres.

Ore is obtained close to the furnace; it is red fossiliferous ore, yielding about 40 per cent. The *top* rock, containing ahout 15 per cent. of ore, is sometimes used for fluxing. A small quantity of limestone is used.

For fuel, the furnace is now using ⅓ soft stone coal (Erie) and ⅔ charcoal. Charcoal is hauled ahout 4 miles on an average.

There are extensive peat deposits in this section. It is expected to make use of them

Some years ago ore was delivered in the top house at $1.50 per ton of iron.

[For the exclusive use of the members of the American Iron and Steel Association.]

IRON WORKS IN NEW YORK.

TABLE OF ROLLING MILLS.

A TABLE showing the name, owner, location, date of erection; number and kind of puddling furnaces; number of heating furnaces; number of nail and spike machines; AND *number of each in use in* 1864. *Number of trains of rolls, and number of hammers; quantity and kind of power used. Production in* 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, *and* 1866. *Quantity of Fuel, Iron, and Ore consumed in* 1864. *Present capacity. Capital invested, &c. &c.*

No.	NAME OF WORKS.	OWNERS AND LESSEES, OR PRINCIPAL OFFICERS.	LOCATION AND POST-OFFICE.	Date of Erection.	Number of Double Puddling Furnaces.	Number of Single Puddling Furnaces.	Number in use in 1864.	Number of Heating Furnaces.	Number in use in 1864.	Number of Nail and Spike Machines.	Number in use in 1864.	Number of Trains of Rolls.	Number of Hammers.	Number of Engines.	Number of Water-wheels.
1	Dannemora Rolling Mill, .	State of New York, . . .	State prison yard, Dannemora, Clinton Co.	1853	0	0	0	2	2	48	30	1	0	1	0
	Eagle Iron Works, . . .	*Abandoned,*	Keeseville, Clinton Co., .	1815	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
2	Peru Steel and Iron Works,	Chas. Bliven, *Pres.* (N.Y.) Wm.H. Gunther, *Treas.* J. L. Myers Taylor, *Man.*	Clintonville, Clinton Co.,	1825	0	0	0	4	4	0	0	3	0	0	5
3	Sable Iron Works, . . .	J. & J. Rogers, ...	Ausable Forks, Essex Co.,	1834	0	0	0	4	4	46	0	2	0	2	1
	Bouquet Iron Works, . .	*Abandoned,*	2½ miles W. of Essex Village, Essex Co.	1827	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
4	Cohoes Iron Works, . . .	Morrison, Colwell & Page, .	Cohoes, Albany Co., . . .	1864	2	0	1	1	1	0	0	2	0	0	2
5	Rensselaer Iron Works, .	John A. Griswold, *Agt.* George Babcock, *Supt.*	Troy, ...	1846	0	14	14	12	12	0	0	5	0	3	0
6	Troy Iron Works, . . .	H. Burden & Sons, . . .	Troy, ...	1809	5	40	40	12	9	13	10	10	1	11	2
7	Albany Iron Works, . . .	Cornings & Winslow, . .	Troy, ...	1809	0	31	29	10	10	55	35	8	4	6	3
8	Ulster Iron Works, . . .	Tuckerman, Mulligan & Co.,	Saugerties, Ulster Co., . .	1824	8	1	8	5	4	0	0	6	1	0	3
9	Napanoch Forge & Rolling Mill, ...	Napanoch Axe & Iron Co. Geo. W. Babcock, *Supt.*	Napanoch, Ulster Co., .	1846	0	2	2	2	2	0	0	2	5	0	9
10	Samsondale Iron Works, .	John Peck, *Owner,* . . .	Samsondale, near Haverstraw, Rockland Co. P.O., 388 Fifth Av., N.Y.	1832	0	7	7	4	4	0	0	4	0	2	1
	Ramapo Iron and Steel W'ks,	*Abandoned,*	Near Ramapo, Rockland Co.,	1800*	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
11	Suffern's Rolling Mill, . .	James Suffern, *Owner.* James B. Suffern, *Supt.*	½ mile W. of Suffern Station, Rockland Co.	1850	0	1	1	1	1	0	0	2	1	0	2
12	N. Washburn & Co., . .	N. Washburn & Co., . .	Spuyten Duyvel, Westchester Co.	1863	5	0	5*	9	9*	0	0	2	0	4	0
13	Dry Dock Rolling Mill, . .	I. Coryell, *Prest. & Treas.*	New York City, . . . P O., 413 E. 10th St., N.Y.	1865–6	0	0	0	3	0	0	0	2	0	2	0
14	Jefferson Nail Works, . .	M. E. McCollum,	Carthage, Jefferson Co., .	1847	0	0	0	1	1	3	3	1	1	0	3
15	Rome Iron Works, . . .	Edward Huntington, *Prest.* W. L. Howland, *Treas.* T. G. Nock, *Supt.*	Rome, Oneida Co., . . .	1866–7	0	0	0	6	0	0	0	1	0	2	0
16	Delano Iron Works, . . .	Chas. Nichols, *Prest.* P. Lynch, *Treas.*	Syracuse, ...	1865	0	0	0	8	0	0	0	1	0	2	0
17	Syracuse Iron Works, . .	R. N. Gere, *Prest. & Man.* J. F. Wilkinson, *Sec. & Tr.*	Syracuse, ...	1861	3	0	2	3	3	3	0	3	1	6	0
18	Ontario Iron Works, . .	Albert G. Cook, *Prest.* E. P. Burt, *Treas. & Man.*	Oswego, ...	1864–5	1	7	0	2	0	0	0	2	1	2	0
19	Richardson's Iron Works, .	W. C. Beardsley & Chas. Richardson, *Mans.*	Auburn, Cayuga Co., . .	1853	0	0	0	1	1	0	0	1	1	2	0
20	Elmira Rolling Mill, . .	Asher Tyler, *Prest.* H. W. Rathbone, *Tr. & Sec.* D. W. Samuel, *Supt.*	Elmira, ...	1860	4	1	5	10	6	0	0	4	0	6	0
21	Buffalo Iron and Nail Co.,	Pratt & Co. E. S. Hawley, *Supt.* J. Corns, *Man.*	Black Rock, near Buffalo, P.O., Buffalo.	1847	0	16	12	6	4	32	40	6	1	8	0
22	Buffalo Union Iron Works,	Chas. F. Wadsworth, *Prest.* G. R. Wilson, *V.-Prest.* Geo. Beals, *Sec. & Treas.*	Buffalo, ...	1862–4	14	0	14	15	15	0	0	5	1	19	0
	Total, ...				42	120	140	121	92	200	118	73	18	78	31

Entered according to Act of Congress, in the year 1865, by HENRY MCALLISTER, JR., in the Clerk's Office of the District Court of the United States for the Eastern District of Pennsylvania.

IRON WORKS IN NEW YORK.

TABLE OF ROLLING MILLS—*Continued.*

A TABLE showing the name, owner, location, date of erection; number and kind of puddling furnaces; number of heating furnaces; number of nail and spike machines; AND *number of each in use in* 1864. *Number of trains of rolls, and number of hammers; quantity and kind of power used. Production in* 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, *and* 1866. *Quantity of Fuel, Iron, and Ore consumed in* 1864. *Present capacity. Capital invested, &c. &c.*

NAME OF WORKS.	PRODUCTION. (In Tons of 2000 lbs.)												
	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Dannemora Rolling Mill,	160*	900*	1,800*	2,400	2,400	2,400	2,400	2,000	1,600	1,800	1,800	2,350	2,500
Eagle Iron Works,	5,000*	5,000*	5,000*	3,000*	3,000*	3,000*	2,000*	600*	500*	0	0	0	0
Peru Steel and Iron Works,	1,504	2,281	1,751	2,280	1,589	1,854	2,233	1,040	1,016	1,806	2,253	1,809	1,339
Sable Iron Works,	2,621	3,513	3,272	3,461	3,000	3,500	2,500	2,500	2,800	672	0	1,680	2,800
Bouquet Iron Works,	1,568*	1,568*	1,568*	0	0	0	0	0	0	0	0	0	0
Cohoes Iron Works,	0	0	0	0	0	0	0	0	0	0	250*	500	950
Rensselaer Iron Works,	3,838	10,880	15,193	15,455	16,789	20,409	15,153	14,492	13,988	19,421	19,386	16,831	20,216
Troy Iron Works,	8,815	6,985	8,137	7,360	5,240	7,840	7,940	8,030	10,700	13,130	18,190	13,660	16,922
Albany Iron Works,	8,558	8,724	12,953	8,492	9,117	13,216	11,682	9,968	13,586	13,713	13,686	9,520	11,250
Ulster Iron Works,	4,480*	4,480*	4,480*	4,166	4,728	4,890	3,975	3,979	5,835	6,084	6,938	6,332	6,554
Napanoch Iron Works,	600	600	600	200	200	200	800	1,000	1,000	1,200	1,200	800	700
Samsondale Iron Works,	0	0	0	0	0	0	0	50	200	700	1,000	600	600
Ramapo Iron and Steel Works,	680*	50*	150*	0*	0*	0	0	0	0	0	0	0	0
Suffern's Rolling Mill,	350*	350*	300*	200*	250*	300*	300*	300	330	330	330*	330	225
N. Washburn & Co.,	0	0	0	0	0	0	0	0	0	0	7,152	5,500*	9,360
Dry Dock Rolling Mill,	0	0	0	0	0	0	0	0	0	0	0	0	850
Jefferson Nail Works,	168*	168*	168*	100	130	147	135	110	100	160	131	100	110
Rome Iron Works,	0	0	0	0	0	0	0	0	0	0	0	0	0
Delano Iron Works,	0	0	0	0	0	0	0	0	0	0	0	0	7,832
Syracuse Iron Works,	0	0	0	0	0	0	0	0	1,228	2,032	2,684	2,663	3,354
Ontario Iron Works,	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200
Richardson's Iron Works,	0*	0*	0*	471	472	185	645	435	476	635	867	575	778
Elmira Rolling Mill,	0	0	0	0	0	0	0	5,296	13,931	12,977	13,332	15,000	16,800
Buffalo Iron and Nail Co.,	2,000	2,400	2,800	3,000	3,100	3,300	3,400	3,560	4,000	4,180	5,140	5,004	6,307
Buffalo Union Iron Works,	0	0	0	0	0	0	0	0	0	7,117	19,136	19,212	18,497
Total,	40,342	47,899	58,172	50,585	50,015	61,241	53,163	53,360	71,290	85,957	113,475	103,666	129,144

* Estimated.

IRON WORKS IN NEW YORK.

TABLE OF ROLLING MILLS—*Continued.*

A TABLE showing the name, owner, location, date of erection; number and kind of puddling furnaces; number of heating furnaces; number of nail and spike machines; AND *number of each in use in* 1864. *Number of trains of rolls, and number of hammers; quantity and kind of power used. Production in* 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, *and* 1866. *Quantity of Fuel, Iron, and Ore consumed in* 1864. *Present capacity. Capital invested, &c. &c.*

NAME OF WORKS.	Utmost Annual (present) Capacity.	Weeks in operation in 1864.	CONSUMED IN 1864. In Tons of 2000 lbs. Iron.	Ore.	Anth'cite Coal.	Bitumin. Coal.	In Bushels. Charcoal.	Capital invested.	REMARKS.
Dannemora Rolling Mill, . .	3,000	36*	2,240	0	0	0	0	$	Nails and bar iron are manufactured from blooms made from ore. Use escape heat from forge fires.
Eagle Iron Works, ...	. . .	0	0	0	0	0	0	. . .	Now converted into a horseshoe nail works.
Peru Steel and Iron Works, .	5,000	40	2,628	0	0	300*	0	$	Make bar iron out of blooms made in the forges of the Company.
Sable Iron Works, ...	4,700	0	0	0	0	0	0	$	Make nails, spikes, and some bar iron out of blooms made at the forges of the owners.
Bouquet Iron Works, . . .	. . .	0	0	0	0	0	0	. . .	Abandoned about 1857.
Cohoes Iron Works, . . .	1,650	20*	300*	100*	0*	375*	0	$	Axe iron, &c.
Rensselaer Iron Works, . .	22,500	45	22,375	3,243	13,098	10,411	0	$350,000	Rails chiefly, and some merchant bar.
Troy Iron Works, ...	33,000	50	18,960	8,500	11,180	20,843	0	$	Merchant iron, horseshoes, spikes, and rivets.
Albany Iron Works, . . .	18,000	44	15,120	6,160	6,720	22,500	1,500	$1,200,000	Merchant iron, shapes, car axles, spikes, rivets, nails, &c.; also blister steel.
Ulster Iron Works, ...	7,000	48	8,789	3,792	4,432	8,807	0	$	Merchant iron.
Napanoch Iron Works, . .	1,500	39	1,350	100	1,000	600	10,000	$60,000	Hammered and rolled iron.
Samsondale Iron Works, . .	3,000	45	1,300	250	0	2,500	0	$	Sheet iron.
Ramapo Iron and Steel Works,	. . .	0	0	0	0	0	0	. . .	Abandoned about ——.
Suffern's Rolling Mill, . . .	450	30*	440*	35*	0	525	0	$	Merchant bar.
N. Washburn & Co., . . .	19,000	30*	8,000*	500*	0	8,000*	0	$	Rails.
Dry Dock Rolling Mill, . .	3,600	0	0	0	0	0	0	$114,000	Merchant and horseshoe iron.
Jefferson Nail Works, . . .	300	24	100	0	0	0	2,500	$	Horseshoe iron and nails.
Rome Iron Works, ...	10,000	0	0	0	0	0	0	$	Re-roll rails.
Delano Iron Works, . . .	12,000	0	0	0	0	0	0	$180,000	Re-roll rails.
Syracuse Iron Works, . . .	6,000	40	3,525	380	800	1,600	0	$200,000	Bar and horseshoe iron and a few spikes.
Ontario Iron Works, . . .	3,000	0	0	0	0	0	0	$	Merchant and horseshoe iron.
Richardson's Iron Works, .	1,500	45	1,000	0	0	1,000	0	$30,000	Horseshoes chiefly.
Elmira Rolling Mill, . . .	20,000	45	13,500	0	0	20,000	0	$	Rails and merchant iron.
Buffalo Iron and Nail Co., .	11,000	48	8,396	733	82	12,644	0	$	Bar iron, cut nails, horseshoes, spikes, &c. There is a blast furnace operated by same parties.
Buffalo Union Iron Works, .	40,000	44	25,537	243	6,482	21,436	0	$600,000	Rails, bar iron, and wrought iron beams (also pig iron).
Total, ...	226,200		133,560	24,036	43,794	131,541	14,000		

ROLLING MILLS IN NEW YORK.

THERE are in the State of New York 22 rolling mills, distributed as follows: Three in the Lake Champlain district, rolling bars and nail plate from blooms; one at Cohoes, making axe iron, &c.; three large establishments at Troy, turning out a great variety of products; one bar mill at Saugerties; a small bar mill at Napanoch; one sheet iron mill at Samsondale, near Haverstraw; one small bar mill at Suffern; one rail mill at Spuyten Duyvel; and a small new bar mill in New York City. At Carthage, Jefferson County, is a train of rolls making nail plates; at Rome, a rail mill for re-rolling only (no puddling furnaces), not yet finished; at Syracuse is a similar mill, that has been in operation about 5 years; there is also a bar mill at Syracuse; at Oswego is a bar mill, and another at Auburn; there is a rail mill at Elmira; near Buffalo is a bar mill; and at Buffalo a very large establishment making rails, bar iron, wrought iron, beams, &c.

The mills making rails are the Rensselaer Iron Works (Troy); N. Washburn & Co. (Spuyten Duyvel); Rome Iron Works (Rome—not yet finished); Delano Iron Works (Syracuse); Elmira Rolling Mill (Elmira); and Buffalo Union Iron Works (Buffalo). In all, 6 mills.

The greatest centre of rolling mills in the State is Troy; the combined capacity of the Rensselaer Iron Works, Troy Iron Works, and Albany Iron Works, being between 70,000 and 80,000 tons. The puddling capacity of Troy is probably greater than that of any other single town in the United States outside of Pennsylvania. There are about 5 double and 87 single puddling furnaces, 33 heating furnaces, and 23 trains of rolls in Troy.

Next to Troy, Buffalo and vicinity is the most important rolling mill centre in the State.

The 22 mills (including the rail mill at Rome, not quite completed) in New York contain 42 double and 120 single puddling furnaces, 121 heating furnaces and 73 trains of rolls.

But few mills have been abandoned during the past 10 years.

DANNEMORA ROLLING MILL, State prison yard, Dannemora, Clinton Co. Make nails and bar iron from blooms. Ore is mined on the property, and worked in forge fires. Convict labor is employed. (See *Forges.*)

(*Eagle Iron Works* were situated at Keeseville, 5 miles west of Port Kent, chiefly on the north bank of the Ausable River, in Clinton County.

Works embraced two rolling mills, a large machine shop, and a nail factory. Merchant iron, horseshoes, rolling-mill machinery, steam engines, and nails were made here. Product of latter was at one time perhaps 4000 tons per annum. Works were much injured by the great freshet of October, 1856.

Product of works in 1854, '55, and '56 estimated at 5000 tons per annum. After this the product was smaller; and in February, 1863, works passed into the hands of the present proprietors, the Ausable Horse-Nail Company, who manufacture horseshoe nails only. No rolling is done.

The nails are made exclusively of Norway iron, rolled into rods of the proper size at the Norway Iron Works, Boston. The Company have 50 of Dodge's horseshoe nail machines, each capable of turning out about 100 pounds (average sizes) horseshoe nails a day. The same machine is in use at Chicago and New London. Mr. Dodge, the inventor, is a resident of Keeseville. Rods are heated with anthracite.

Product of horseshoe nails in 1863 about 100 tons; in 1866, about 500 tons. Present capacity, 750 tons. Water privilege is excellent, and power is furnished by 4 Chapman's turbine wheels.)

PERU STEEL AND IRON WORKS, Clintonville, Clinton County. J. L. Myers Taylor, Manager.

Product is in bar iron and some nail plate rolled out of the blooms made in the forges of the Company. A small quantity of scrap is purchased in the neighborhood of the works; it is used in horseshoe iron chiefly.

The mill contains 4 heating furnaces, 3 trains of rolls, and 5 water-wheels. The mill and the Company's upper forge are in the same building. Two of the furnaces are heated with escape heat from the four forge fires, two fires to each furnace; these are chiefly used. The other two furnaces are employed only occasionally. Cumberland coal is generally used in them.

The loss in converting blooms into finished bars averages about 14 per cent. From 1854 to 1864 inclusive, almost the whole product of the forges passed through the mill. In 1865 about seven-eighths, and in 1866 five-eighths, of the product was rolled. The figures of production have been calculated accordingly. Capacity of mill is about 5000 tons. (See *Forges.*)

SABLE IRON WORKS. J. & J. Rogers. Ausable Forks, 16 miles from Port Kent, Essex County.

The Messrs. Rogers have a rolling mill, nail factory, and foundry in connection with their forges.

The amount of nails and bar iron made is chiefly dependent upon the condition of the market for blooms. When blooms are dull, and nails and bar iron are brisk, a large portion of their blooms pass through the mill; and when the reverse is true, the rolling mill does little.

Product of the mill is therefore irregular. It has been about as follows:

Made in	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs. . .	2621	3513	3272	3461	3360	3890	2800	2800	2800	672	00	1680	2800

Capacity about 4700 tons.

Mill was injured by the freshet of October, 1856. It contains 4 heating furnaces, 2 trains of rolls, 2 spike and 44 nail machines, 2 engines, and 1 water-wheel.

Foundry makes castings for mill and works. (See *Forges.*)

(*Bouquet Iron Works*, on Bouquet River, 2½ miles west of Essex Village, Essex Co. Worked up blooms into merchant bars and nails. Used Cumberland coal. Have done nothing since about 1856.)

COHOES IRON WORKS. Morrison, Colwell & Page. E. N. Page, Superintendent, Cohoes, Albany County, N. Y.

Axes, &c., were formerly made at these works. They were changed into a rolling mill in the spring of 1864. They were owned for the first year by Simmons & Page, but made very little iron. They were purchased by the present proprietors in March, 1865, who have considerably increased their capacity, and are still enlarging them.

The mill now contains 2 double puddling furnaces, 1 heating furnace, 1 jaws squeezer, 2 trains of rolls (18 inch and 14 inch), and 2 water-wheels. A train of 9-inch rolls is to be put in shortly; as also 2 puddling furnaces, when one of the old furnaces will be turned into a heating furnace—making 3 puddling and 2 heating furnaces.

Water power is very fine. The special head of water is 18 or 20 feet. The rolls are driven by a Conner's wheel, 3½ feet in diameter. Bellows, shears, &c., are run by a turbine.

Use Lake Champlain ore in puddling. Coal is Fall Brook, Blossburg; it comes from Watkins by water.

Product is in axe iron, &c. It finds a market at Cohoes, Boston, and other places. Iron consumed is about one-third wrought scrap, one-half anthracite pig, and the balance charcoal pig. The proportion of the latter used is diminishing.

Product of mill in 1865, about 500 tons; and in 1866, about 950 tons. Capacity, 1650 tons.

There is a stove foundry at Cohoes, owned by Morrison & Colwell of this firm.

RENSSELAER IRON COMPANY. Erastus Corning, Erastus Corning, Jr., John F. Winslow, and John A. Griswold, owners; John A. Griswold, Agent; George Babcock, Superintendent, Troy. Capital, $500,000.

Works were erected in 1846. They were taken by the present company in 1853, after lying idle for about five years. In 1854, rolling was commenced, but little was done that year in consequence of repairs. Since that time the mill has been running regularly. Its product is chiefly rails, with a small proportion of merchant iron. Formerly a few tires were rolled, but this has been abandoned.

The works contain 14 single puddling and 12 heating furnaces, 5 trains of rolls, 3 engines, 1 Burden squeezer, &c. The largest engine is a beam engine, formerly belonging to a steamboat; its cylinder is 60 in., and its stroke 10 ft. A second engine has a 20-in. cylinder, and a 3-ft. stroke; and the third an 18-in. cylinder, and 2½-ft. stroke.

The product of the works has been as follows:

Made in	1854	1855	1856	1857	1858	1859	1860
Tons of 2000 lbs. . . .	3838	10,880	15,193	15,455	16,789	20,409	15,153

Made in	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs. . . .	14,492	13,988	19,421	19,386	16,831	17,472 rails. 2,744 merch't iron.

The product of 1864 was 16,185 tons rails, and 3201 tons of merchant bar. Value about $2,000,000. The consumption in that year was 6322 tons pig, 292 tons wrought scrap, 15,761 tons old rails, 3243 tons Port Henry ore, and 13,098 tons anthracite, and 10,411 tons bituminous coal. At the same time, about 480 men were employed, supporting some 2000 persons.

The Company are now erecting a very fine brick mill, 400 feet long, and 100 feet wide, under a single span. This mill is to contain the heating furnaces, and the rail and merchant trains. The puddling department will remain in the present building, and the number of furnaces be increased.

The merchant mill is to be transferred to this building this winter, but rails will probably not he rolled here till next summer (1867).

The works are about three-quarters of a mile below the Troy Union Depot; they have an extended river front, and the railroad passes directly alongside the mill. It is expected to roll both steel and iron rails in the new mill.

The works are indirectly connected with the Albany Iron Works, the Troy Bessemer Steel Works, the Fort Edward Furnace, and the Hudson Furnaces.

TROY IRON WORKS. H. Burden & Sons (Henry Burden; William F. Burden, Agent; James A. Burden, Superintendent; and I. Townsend Burden).

The Wynantskill is a creek of moderate size, which empties into the Hudson about 1½ miles south of the Union depot in Troy. It flows in a general southwesterly direction, and in the last three-quarters of a mile of its course it descends by a series of falls through several hundred feet.

Previous to 1809 there were no iron works upon the creek; but in that year two water-power leases were obtained, one for a successiou of falls amounting to about 72 feet, by John Converse, of Troy, and six others; and the second by J. Brinckerhoff, of Albany, for about the same number of feet below the former. Upon the upper lease was formed the germ of the Troy Iron Works; and upon the lower that of the Albauy Iron Works.

The water power of the Wynantskill was very valuable for the extent of its head, and the abundance of its supply at certain seasons of the year, but was unreliable. Efforts were made at an early day to improve the privilege; and to carry out the project more effectually, the "Wynantskill Association" was incorporated in 1846. A large number of reservoirs and dams have been built, and now the privilege is considered reliable at all seasons.

John Converse and his six partners before mentioned built a small mill for turning Swedish bar into nail plates, and spike- and horse-nail rods. In 1812 the establishment was incorporated as the "Troy Iron and Nail Factory," with a capital of $96,000, in sixteen shares. John Converse was the superintendent of the works until 1821. Henry Burden took the superintendence in 1822. The mill then contained but a single pair of rolls (rolling and slitting imported iron into nail-and spike-rods), and a few machines for cutting nails.

From this small beginning the Troy Iron Works, which rank among the largest in the country, have gradually grown up. In 1835 Mr. Burden owned about one-half the works, and in 1848 he had become the sole owner. His three sons are now associated with him, and the style of the firm is H. Burden & Sons.

The product of the works is in pig iron, bar iron, horseshoes, spikes, and rivets.

The establishment embraces the upper works, situated on the site of the original mill, and the lower, or new works, upon the Hudson.

The upper works comprise an extensive rolling mill, the horseshoe department, the spike and rivet department, a foundry, machine shop, blacksmith shop, pattern shop, carpenter shop, &c. &c.

The rolling mill contains 14 single and 2 double puddling furnaces, 5 heating furnaces, 6 trains of rolls, 1 Burden squeezer, &c. The puddling furnaces are mostly on a higher level than the squeezer and rolls, and the puddle balls are thrown down into the squeezer.

No bar iron is made in this mill, but only horseshoe iron and spike- and rivet-rods. The horseshoe department adjoins the mill; it contains six of Burden's horseshoe machines. There is a furnace about 30 feet long to each machine. The machine takes the bar, and it is directly converted into horseshoes at the rate of about one a second.

In 1834, Burden's first horseshoe machine was set up, and patented in 1835. An improved machine was erected in 1843. The present machine was perfected and patented in 1857.

The capacity of the six machines is readily 1000 kegs of 100 pounds each in 24 hours. The value of the invention to the country during the late rebellion can hardly be overrated; and the abundant supply of horseshoes in the army was a subject causing much surprise to foreign officers. The machines have been introduced in several of the European countries.

The shoes, as they leave the machines, fall upon an iron endless-belt, and are carried under the road into the punching department, where they are sorted and punched. For the latter purpose there are 40 machines. After punching, the shoes are put with sawdust in large wooden cylinders, which are rapidly revolved, to remove the grease collected in the last operation. The shoes are then packed in kegs, and are ready for shipment.

In the spike and rivet department there are 11 machines.

Mr. Burden was the inventor of the first spike machine. He patented it in 1825. In 1840 he obtained a patent for his "hook-headed" spike machine.

Another invention of Mr. Burden's, to be classed in importance with the spike and horseshoe machines, was the well-known rotary squeezer, which bears his name. It was patented in 1840. This squeezer is uow very widely used, both in this country and in Europe.

The most remarkable feature of the upper works is the great water-wheel, which drives the 6 trains, the squeezer, the 6 horseshoe machines, the 40 punchers, the 11 spike and rivet machines, the machinery of the large machine and other shops, the blowers, &c. &c. It also pumps water to Mr. Burden's house on the hill above the works.

The variety and amount of work done is very remarkable. It is the largest water-wheel in the country, and the third largest in the world. It is an overshot 60 feet in diameter, and 22 feet face. The buckets are curved, and 6 feet 3 inches deep. The water falls several feet before reaching the wheel. With full buckets, the power of the wheel is calculated at about 700 horse. The whole power is never used. The buckets are generally less than half full; there is then very little *waste* of water. The power generally used is perhaps 300 to 350 horse, which is ample for all work desired. The wheel furnishes power for everything connected with the upper works. There is a second wheel used for running the machine and blacksmith shop (there is a light tilt-hammer in this shop), &c., when the great wheel is stopped. There is also a small engine used for blowing the furnaces under the same circumstances. This latter is to be replaced by a small wheel.

The machine and other shops are very extensive, and the details very complete. Even the wagons belonging to the works are built in the shops. There is a great deal of hauling, as everything comes to and leaves the works by wagon. The foundry contains a cupola furnace.

At the upper works is the principal office of the Company; it is about three-eighths of a mile from the Ironworks Station on the Troy and Greenbush Railroad.

Some distance above the upper works there is an unoccupied head of water of about 70 feet. It is proposed to make use of this power to run a cotton factory to afford employment to the female portion of the families, the male portion of which are now employed in the iron works.

The new, or lower works, are situated on the river bank north of the mouth of the creek. The ground here was very low, but has been filled in and raised. The property is quite extensive. The new works were commenced about 1862. As they now stand, they embrace the "steam forge," so called, the rolling mill, the office, machine shop, &c., and an anthracite blast furnace. The "steam forge" is the puddling department of the works. The building is well finished; it is of brick, parallel with the river, 426 feet long, and 84 feet wide. It contains 26 single and 3 double puddling furnaces, 7 heating furnaces, 2 trains of rolls, 1 squeezer, and 1 steam hammer. The boilers are over the furnaces. The train is in the middle of tbe building, and placed in the direction of its length; it is driven by a Corliss direct-acting vertical engine, having a 36-in. cylinder, and a 42-in. stroke.

The hammer is a Morrison, built by Sellers. Weight of ram is about 6 tons, 6-feet lift. It is designed for forging heavy slabs, shafting, &c. The rolling mill is at right angles with the river; it is 300 feet long, and 96 feet wide; it contains 6 heating furnaces, 2 trains of rolls, and 2 engines similar in character and size to the one in the forge building. The building containing the machine shop, blowing engine, office, &c., is 96 feet sqnare. The three buildings named form an L, the office being in the elbow.

The product of the mill is in merchant iron. The number of heats made in the 12 hours is generally 6.

In the upper and lower works together there are 5 double and 42 single puddling furnaces, 12 heating furnaces, 10 trains of rolls, 2 squeezers, 1 hammer, 11 engines, and 2 water-wheels.

Products are horse- and mule-shoes, railroad-, ship-, boat- and counter-sunk spike, boiler rivets, and merchant bars.

Made in	1858	1859	1860	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs. . .	5240	7840	7940	8030	10,700	13,130	18,190	13,660	16,922

Utmost capacity, 36,000 tons.

Value of products in 1864, $2,013,095.

Consumed in 1864, 32,000 tons anthracite and bituminous coal; Cheever ore, ——— tons.

North of the lower rolling mill is the new anthracite furnace. It was built in 1865; went into blast about the end of February, 1866. It is 50 feet high, 16 feet across the boshes.

Blast is driven at a temperature of about 600°, and a pressure of about 5 pounds through — tuyeres. The engine is horizontal, built from Rumpp's drawings; it works very well. The furnace has a water hoist.

The ore consumed is Cheever magnetic and Bennington County, Vt., hematite. One-half the iron is from each ore. The iron made is chiefly soft found.

The product of this furnace for its size has been remarkably large.

In 35 days, mostly in November, 1866, it produced—

Gross Tons.	Cwt.	
677	5	. . . No. 1.
358	10	. . . " 2.
132	15	. . . " 3.
7	5	. . . " 4, mottled.
1175	15	Average 33½ tons per day.

Coal consumed, 3222 lbs. (Pittston and Lehigh mixed) to the gross ton of iron.
Ore " 3851 " to the gross ton of iron.
Limestone " 1049 " to the gross ton of iron.

For March, 1867—28 days—the product was as follows:

Gross Tons.	
837	. . . . . No. 1,
223	. . . . . No. 2,
17	. . . . . No. 3,
1077	Average, 38½ tons per day.

Coal, per gross ton iron made, 3058 lbs.
Ore, " " " 3825 "
Limestone, " " 1009 "

A second furnace is being erected alongside the first. It is to be similar to it in size, &c.

H. Burden & Sons are the owners of the Shaftsbnry Charcoal Furnace and extensive mines in Bennington County, Vt. (See *Charcoal Blast Furnaces in New England.*)

Total number of men employed at works and mines, about 1300.

H. Burden & Sons are also part owners of the Buffalo Union Iron Works and the Chattanooga Rail Mill.

ALBANY IRON WORKS are situated in Troy (about 1¼ miles south of the Union Depot), on the banks of the Wynantskill, a short distance above its mouth, and near the Ironworks Station on the Troy and Greenbush Railroad.

The owners are Cornings & Winslow (John F. Winslow, resident partner; Erastus Corning, and Erastus Corning, Jr.); John H. Snyder is Superintendent, and Robert Bainbridge, Accountant.

In 1809, J. Brinckerhoff, of Albany, leased the water power of the Wynantskill, and founded the present works. They were originally a small foundry and rolling mill. In the latter, Swedish and Russian bars were rolled into nail plate, from which hand-headed nails were made.

In 1835 the present superintendent took charge of the works. Their production at that date was about 6½ tons of various kinds of iron per day.

In 1837 Mr. Winslow took the controlling interest in the works, and they became known as the Albany Iron Works.

In 1838 puddling commenced. At that time it was conducted in no other establishment in New York, except the Ulster Works.

The present product of the works is in merchant iron; shapes; car axles; ship-, railroad-, and boat-spikes; rivets, &c.; nails, &c.; solid and folded lip railroad chairs; horseshoe-nail rods; puddled steel; blister steel in bars and rolled; steel boiler plate, &c. &c. Near hy are the Bessemer Steel Works of Winslow, Griswold & Holley, many of the ingots from which are made into boiler plate, &c., at the Albany Iron Works.

The works comprise 3 rolling mills, a spike and nail factory, besides cooper-, pattern-, blacksmith-, machine-shops, &c.

The 3 rolling mills are known as the "Steam mill," the "Star mill," and the "Water mill."

The Steam mill was started in 1849. It contains 18 single and 1 double puddling furnace (the latter is used exclusively for making puddled steel), 6 heating, and 1 scrap furnace, 3 trains of rolls, and 1 Winslow squeezer. The rolls are driven by a horizontal engine of 44-in cylinder and 6 ft stroke. One train of rolls is for balls, one for merchant iron, and one (driven by belting) for horseshoe and other small iron. The well-known Winslow squeezer is in operation here; it was invented at these works.

In this building is a 5-ton Nasmyth hammer, with a fall of about 3½ feet, and a cylinder of 24 inches; also a small Nasmyth, not now used. The large hammer is used for hammering steel ingots from the Bessemer Works. The mill also contains 2 steam tilt-hammers (direct lift), of about 750 lbs., for forging car axles. The axles are made of piled bars rolled into shape and hammered. About 33 can be made in 10 hours.

The machines for making patent folded lip railroad chairs are in the building. The patent solid lip chair (a better chair) is also made in large quantities. It is a bar rolled to shape, and cut into proper lengths by saws. It was invented here. The manufacture of folded lip chairs commenced about 1850. and of solid lip about 1858.

In the Star mill there are 12 single puddling and 3 heating furnaces, 3 trains of rolls, 2 engines, and 1 Winslow squeezer. One train of rolls is for balls and steel boiler plate, one for merchant iron, and the third for slit rods for horseshoe nails. The slit rods are made from Swedish iron—the only purpose for which foreign iron is used in the works except when specially ordered.

In the Steam and Star mills there is generally one boiler to each furnace. The boilers are on the same level with the furnace. They are cylindrical, and without flues, 40 feet long, and 3 feet in diameter.

The Steam and Star mills, machine shop, &c., are on the south side of the creek; the older portion of the works, embracing the water mill and nail factory, are on the north side.

The Water mill contains 2 heating furnaces and 2 trains of rolls. One train is for small square and round iron for spike rods, &c.; the other is for nail plate, plough- and cultivator steel, &c. The water-wheel is an overshot, 24 feet in diameter, and 22 feet face.

In this building are also 4 cementing furnaces for making blister steel. They are very old. Their capacity is about 14 tons each. There was connected with the works, many years ago, a spring factory. The blister steel is made from scrap iron bars in part, and sometimes from puddled, or semi-steel made in the works. The difference between the two in the time of conversion is about 3 days. The blister steel made is used for ploughs, cultivators, &c.

Next to the Water mill is the spike and rivet factory, where there are 12 machines, and adjoining it the nail factory, containing 43 machines.

Near the Steam mill is the horseshoe department, containing two of Winslow's horseshoe machines. When running, a machine can make 30 shoes in a minute.

The machine shop and pattern shop are well fitted up. The blacksmith shop contains a light trip-hammer, 5 fires, and a small furnace.

To sum up, there are in the works 1 double (for steel) and 31 single puddling furnaces, 10 heating furnaces, 1 heating furnace for steel, and 1 annealing furnace, 4 cementing furnaces, 12 spike and rivet machines, 43 nail machines, 2 folded lip railroad chair machines, 2 horseshoe machines, 8 trains of rolls, 4 hammers, 6 engines (3 in Steam mill, 2 in Star mill, and 1 for shops); also several small steam pumps, and 3 water-wheels.

The coal used is chiefly from Blossburg, Pennsylvania.

The product of the works in 1864 was 13,686 tons. The consumption of iron in that year was 15,120 tons; of ore in puddling furnaces, 6160 tons; of anthracite coal, 6720 tons, and of bituminous coal, 22,500 tons. About 1500 bushels of charcoal were used in the manufacture of steel.

The amount of capital invested in the Albany Iron Works is estimated at $1,200,000.

[NOTE.—Since the above was written, Mr. Winslow has sold out his interest in these works.]

ULSTER IRON WORKS. Saugerties (west side of Hudson River), Ulster County. Tuckerman, Mulligan & Co. William Mulligan, Manager.

Works are located at head of tide on Esopus Creek, about one-quarter mile from the Hudson River. They were built by Henry Barclay about 1824; the style of the concern being the Ulster Iron Company. In 1844 they passed into the hands of Horace Gray & Co., as lessees; this latter Company failing in 1847, they were leased by J. & L. Tuckerman. In 1849, the works were purchased by J. & L. Tuckerman and others, who have run them ever since. In 1863, Mr. William Mulligan became connected with the works as manager, and in 1864, the firm took its present style.

Works are old, but well arranged, and quality of iron made is well known. Product is in bar, rod, hoop, band, butt, and hinge, axe iron, &c., &c. Iron consumed is chiefly anthracite pig No. 1, with some little charcoal pig. No scrap, except that made in the works, is used. Coal for puddling is Cumberland, Pictou, and Blossburg mixed; for heating, Pittston.

Ore used in puddling furnaces is Cheever.

Works contain 8 double and 1 single puddling, and 5 heating furnaces, 6 trains of rolls, 1 hammer, and 3 water-wheels.

All the rolls are run by an overshot wheel of 25 feet in diameter, and 18 feet face. A large breast (or rather, 4-5ths high), wheel, 30 feet in diameter, and 9½ feet face, which was built for other works, drives the hammer. This hammer is an old one made of iron and weighing perhaps four tons; it is raised by a cam lift. It is used for hammering puddle balls. There is some restriction as to the amount of water that can be used upon this wheel. There is also in the mill an old and very large Burden squeezer, built on a model and of a size that has been long since abandoned. It is used only in case the hammer is out of order. The blast for the furnaces is obtained by means of three Dimpfel's blowers, which are run by a turbine wheel.

The works have the first right upon the creek to water, and never have been stopped from want of water. A greater power, if it could be obtained, could be used with advantage. There is sometimes trouble from back water, during very high tides.

Facilities for transportation are excellent, vessels coming directly to the works.

In 1864, 6938 tons iron were produced at a consumption of 8789 tons iron, 3792 tons ore, 4432 tons anthracite, and 8807 tons bituminous coal.

NAPANOCH FORGE AND ROLLING MILL is owned by the Napanoch Axe and Iron Company, of which Charles S. Brigham is Treasurer. G. W. Babcock is Superintendent of the iron branch of the business. The works are situated at Napanoch, Ulster Co. The nearest railroad station is at Middletown, Erie Railway.

Works were built in 1846, and enlarged in 1861; they will probably be again enlarged during 1867.

They contain 2 single puddling furnaces, 2 heating furnaces, 2 trains of rolls, 5 hammers, and 9 water-wheels. The present capacity is about 1500 tons.

The present Company have owned the works since October 31, 1866; previous to that time from 1861, they were owned and run by Samuel C. Brown & Co.

A large proportion of the product of the works is hammered bar iron, which is sold in New York and New Jersey to locomotive builders. Rolled iron finds its chief market in the vicinity of the works.

The product of the works in 1860 was about 800 tons; in 1861, 1000 tons; in 1862, 1000 tons; in 1863, 1200 tons; in 1864, 1200 tons; in 1865, 800 tons; and in 1866, 700 tons. Previous to 1860, hammered iron only was made.

The Company also make axes and edge tools, car axles and shapes.

SAMSONDALE IRON WORKS, Samsondale, 1½ miles west of Haverstraw, Rockland Co. A horse railroad extends from the works to the river at Haverstraw.

The mill was built in Wales, at the works of Ottawa, Wennington & Co., in 1832, and brought to this country by the owner, Elisha Peck, Esq. It was at that time one of the finest mills in the country. It ran from about 1833 to 1850, and then was idle—the effect of low ad valorem duties—until 1860, except that a small quantity of copper was at one time rolled here. (A wire mill was erected near here in 1831, but ceased operations about 1848.) The mill has been recently thoroughly repaired, and a new sheet mill erected, nearly douhling the capacity of the works.

The works contain 7 single puddling furnaces, 4 heating furnaces, 4 trains of rolls—1 for bar, 2 for sheet, and 1 for guide iron—1 jaws squeezer, 2 engines, and 1 water-wheel.

The mill is on the Miniscongo Creek, which furnishes a 25 feet head. The privilege is fair. The wheel is an overshot, made entirely of iron. The wheel is of 24 feet diameter and 14 feet face. The shaft is of cast iron, about 2 feet in diameter, and hollow; the bore of the shaft is about 15 inches. The arms and frame are of cast iron, the gudgeons are of wrought iron, and the buckets of plate iron curved. This wheel runs the old sheet train, which is 18 inches in diameter.

The engine is an old one; it is horizontal and high pressure; its cylinder is 30 inches in diameter, and its stroke is 6 feet; its power is rated at 300 horse. It runs the bar train and the new sheet train; the latter is 20 inches diameter.

A 40 horse high pressure beam engine, of 18 inch cylinder and 3 feet stroke, runs the guide mill train.

Blowing is done either by water or steam.

Steam is supplied by 10 boilers; 4 of these are 32 to 36 feet long, 44 inches in diameter, and have each two 15 inch flues. The other 6 boilers are plain cylinders, 20 feet long aud 30 inches in diameter.

The specialty of works is *thin* sheet iron, though all grades can be rolled, from No. 29 wire gauge up to boiler plate, if necessary. The bar train is now used for rolling bars, to be afterwards re-rolled for sheets. Formerly some bar iron was sold.

Capacity of mill for thin sheet, say 2000 tons a year, or for heavy sheet and bar some 3500 tons.

Iron used is chiefly anthracite, with some charcoal pig. Coal for puddling is generally (especially in summer) Cumberland, and anthracite for heating. The latter is either Scranton or Delaware and Hudson coal.

The product of the works in 1864 was about 1000 tons, sheet almost exclusively. In 1865 and in 1866, about 600 tons were made each year.

In 1864, the consumption was about 1300 tons iron, 250 tons Cheever ore, and 2500 tons Cumberland coal.

John Peck, of New York, is the owner of the works. He has been connected with them since their erection.

[*Ramapo Iron and Steel Works* were on the Ramapo River (a small stream), not far from Ramapo Station, E. Railway, Rockland County.]

SUFFERN'S ROLLING MILL is one-half mile west of Suffern Station, E. Railroad, Rockland County. James Suffern, owner; James B. Suffern, superintendent.

Built about 1850; was originally a bloomary forge with three fires. It was changed in 1853 to a rolling mill. It made car axles previous to about 1856. Since then, product has been in merchant iron.

Mill is small. It is on the Ramapo River, which furnishes a moderate power. It contains 1 single puddling furnace, 1 heating furnace, 1 hammer, 2 trains of rolls, and 2 water-wheels. A breast-wheel drives the rolls, and an undershot the fans and shears.

Iron consumed is wrought and cast scrap. No pig is used. In puddling furnace two-third cast and one-third wrought scrap are mixed. New Jersey magnetic ore is used in puddliug furnaces. About thirty-five tons a year are consumed. Coal is chiefly Cumberland. (No steel has been made here.)

Annual product of mill is about 300 tons. In 1866, about 200 tons were made.

N. WASHBURN & CO., Spuyten Duyvel, Westchester County. Nathan Washburn President; J. R. Lawrence, Vice-President; S. Berry, Treasurer; William Lewis, Superintendent.

Mill is on the Spuyten Duyvel Creek, near the Hudson River, about fourteen miles above Thirtieth Street, New York. It was built in 1863 by the Langdon Rolling Mill Company, and commenced rolling rails in 1864. It was purchased by the present Company in January, 1866.

Mill makes only rails. It contains 5 double puddling furnaces, 9 heating furnaces, 1 Burden's squeezer, 2 trains of rolls, and 2 large vertical direct acting engines. Engines are of the same size, 30-inch cylinder and 28 inch stroke. There are 2 smaller engines,—1 vertical and 1 horizontal,—for shears, blowing, machine shop, &c. Rails are now made chiefly from old rails with some puddled iron. A small quantity of Port Henry ore is used in puddling; soapstone is used in the bridges.

Coal is Cumberland and Broad Top mixed in equal quantities.

The mill is a fine one, built of brick and well arranged. The body of the mill is 150 feet square, with a large wing.

Employed about 200 men in 1864.

The capacity of the mill is about 19,000 tons.

Product in 1864, 7152 tons; in 1865, —— tons, and in 1866, 9360 tons.

DRYDOCK ROLLING MILL, 413 East Tenth St., New York City. I. Coryell, President and Treasurer; John Thompson, Secretary.

This is a small mill. It was built in 1865-6, and commenced running May, 1866, making only about 850 tons of iron before the close of the year, as the mill was hardly in running order. It uses wrought scrap only, and makes bar, hoop, and horseshoe iron. The latter is made out of old horseshoes. Bars are made up to 5 inch flats, and 3 inch squares and rounds.

The mill contains 3 heating furnaces, 2 engines, 2 trains of rolls, &c. The main engine is a *segmental* engine, of about 150 horse power. The second engine is a small horizoutal engine, that runs a lathe and a blower.

Coal is chiefly Cumberland. The capacity of the mill is about 3600 tons. Its market is New York city.

JEFFERSON NAIL WORKS, Carthage, Jefferson County, at the terminus of the Black River Canal. The Black River Valley Railroad is to pass near the works. The nearest station now is Philadelphia, on the Watertown and Ogdensburg Railroad, 14 miles, about west.

Works are very small. They comprise a forge containing two fires, in which pig and wrought scrap are made into blooms; a rolling mill containing a 14 inch train, where these blooms are rolled into nail plate, horseshoe iron, and merchant bar, and a nail factory containing three machines. The hammer used on the blooms is a water-tilt.

The product of the works is very small. Fuel is wood and charcoal. The latter cost, in 1865, eight cents per bushel. Water privilege is good. There is a run-out fire not now used.

In 1816, a forge was built in Carthage; it was burned down the same year. Soon after, another forge was built to make mill iron and anchors from ore.

Nail works were originally built in 1828. The present works were built about 1846.

ROME IRON WORKS, Rome, Oneida County. Edward Huntington, President; W. L. Howland, Treasurer; T. G. Nock, Snperintendent.

A new mill, now under construction, will probably commence work about March, 1867. It is designed for re-rolling rails only.

The building is chiefly of brick; it is 200 feet by 120 feet. It is very neatly arranged. It contains 6 large heating furnaces, 2 engines, and 1 train of three-high rolls. The engine for the rolls is horizontal, 30-inch cylinder and 36-inch stroke. A second horizontal engine is for the blowers and shears; it is 14-inch cylinder and 24-inch stroke. There are also 2 small steam pumps.

Each pair of furnaces has two boilers on the same level, 20 feet long. These boilers are 48 inches in diameter, with one 24-inch flue each. Products of combustion will pass nnder boiler, return through flue, and then back over the boiler to a stack about 45 feet high. Stacks have no dampers. One stack to two boilers. The arrangement of the fnrnaces is claimed to be economical and advantageous. Thcre is a pair of auxiliary tubular boilers, 20 feet long. The roll train contains three sets. The rails are to be sawed by movable saws; that is to say, the saws move and not the rail.

The capacity of the mill will be about 10,000 tons per annum.

The facilities for transportation are excellent, as the N. Y. C. Railroad and E. Canal pass alongside of the mill.

DELANO IRON WORKS, Syracuse. In the eastern part of the city, between the N. Y. C. Railroad and Erie Canal. Chas. Nichols, President; P. Lynch, Treasurer; I. T. Ballard, Secretary. H. Delano was formerly President.

Re-roll rails only. Old rails are rolled into flats, which are piled and rolled into rails.

Went into operation in fall of 1865, but did little until spring of 1866. Product for 1865 and 1866, 7832 tons.

Mill contains 8 heating furnaces, 1 train of three-high rolls, and 2 horizontal engines. The main engine has a cylinder of 30 inches, and a stroke of 36 inches. Its fly-wheel weighs about 37 tons. The rails are cut by saws, which are movable, the rail being fixed. Coal used is Blossburg. Capacity 12,000 tons.

SYRACUSE IRON WORKS, Syracuse, Onondaga County. Mill is located in the western part of the city, known as Geddis. It is on the line of the N. Y. C. Railroad, and S. and B. Railroad, about 1¼ miles west of depot. The Erie Canal passes by the works. The facilities for transportation are excellent. Syracuse Iron Works Company: R. N. Gere, President, and J. F. Wilkinson, Secretary and Treasurer.

Works were commenced August, 1861. They contain 3 double puddling furnaces, 3 heating furnaces, 3 trains of rolls, 1 hammer, 1 jaws squeezer, 3 spike machines, and 6 engines.

Engines are as follows:

10-inch	cylinder	and	40-inch	stroke.		
12 "	"	"	40 "	"		
18 "	"	"	60 "	"		
22 "	"	"	80 "	"		
8 "	"	"	18 "	"		
9 "	"	"	18 "	"		

One of the larger engines is a vertical Corliss. Hammer is a Nasmyth, weighing about one ton. All iron is hammered, and jaws are only used in case of hammer being out of repair. Boilers are in part above furnaces, and in part on ground.

Product of works is in merchant bar, bands, hoops, rods, horseshoe iron, scroll iron, &c., and a few railroad spikes and rivets.

Iron consumed is scrap and pig. Of the pig, about three-fourths is anthracite, and one-fourth charcoal. Coal is bituminous from Blossburg, and anthracite from Scranton. Ore is from Port Henry.

In 1864, 1725 tons pig, 1800 tons scrap, 380 tons ore, 1600 tons bituminous, and 800 tons anthracite coal were consumed in producing 2684 tons bar iron, worth $339,500.

In 1865, 2662½ tons were produced with a consumption of 1521 tons pig, and 1571 tons wrought scrap, 572 tons ore, and 5040 tons coal.

In 1866, the production was 3354 tons, and the consumption 2406 tons pig, 1371 tons wrought scrap, 931 tons Cheever ore, and 5689 tons coal.

Capacity of works, 6000 tons. Capital, $200,000.

Market is local; surplus goes to Chicago, Illinois.

ONTARIO IRON WORKS, Oswego. Albert G. Cook, President; H. S. Conde, Secretary; E. P. Burt, Treasurer and Manager.

Situated on the Lake Shore. Large vessels come directly to the works.

Merchant and a small quantity of horseshoe iron are made from Hudson River and New Jersey anthracite pig and scrap.

Market for products is near home, and in the West.

Location of mill is favorable, as it is on the lake and has also excellent canal facilities with the interior of the State, the Hudson River, &c.

Coal is from Blossburg. It comes from Watkins on Seneca Lake, about 135 miles, by water. Cost in fall of 1866 about $6.50.

Mill was built in 1864. It went into operation in early part of 1865. In that year it made about 1200 tons. In 1866 it ran only a part of the year, making about 1200 tons.

Mill contains 1 double and 7 single puddling furnaces, 2 heating furnaces, 2 trains of rolls, 1 Burden squeezer, 1 hammer, and 2 engines. Main engine is a vertical Corliss, direct acting; about 26 inch cylinder, and 42 inch stroke. Second engine is also a Corliss. Steam is furnished by 9 cylindrical boilers without flues, placed over furnaces. Boilers are 20 feet long, and 4 feet 6 inches in diameter. There is also an extra tubular boiler. The hammer is a small Dudgeon; it is not now used.

Iron consumed is about one-quarter scrap and three-quarters pig.

Freight from New York about $2.50 per ton in fall of 1866.

Ore used in puddling furnaces is Lake Champlain. Capital, $200,000.

RICHARDSON'S IRON WORKS, Auburn, Cayuga County. W. C. Beardley, owner; Charles Richardson, Superintendent and Agent.

Works were built for manufacture of car axles in 1853, by Smith, Richardson & Co., and were then known as Auburn Steam Forge. January, 1855, name was changed to Richardson's Iron Works. In 1856, the car axle business getting dull, a train of 9-inch rolls were added for making merchant bar; billets were hammered from scrap piles; capacity was about five tons per day. In May, 1859, works were closed, and soon after sold to the present owner, who put them in operation in November of the same year. They were again closed from August to November, 1861. From the latter date, the manufacture of horseshoes has been the principal business of the concern.

The works contain 1 heating furnace, 1 train of rolls, and 2 engines. One engine has a cylinder of 13 inches and 5 feet stroke; the other, 8 inch cylinder, and 1½ feet stroke.

In 1857 made 200 tons car axles, and in 1858, 45 tons.

Products of rolled iron are as follows:

Made in . . .	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs.	271	427	185	645	435	476	635	867	575	778

Utmost capacity, 5 tons per day.

In 1864, ran 45 weeks, and consumed above 1000 tons scrap, and 1000 tons Blossburg coal. Value of products in 1864 about $100,000.

In 1865, made 225 tons bar, and 350 tons of horseshoes. Scrap iron is purchased in the vicinity of the works; bar finds a home market, while horseshoes go chiefly to Southwestern States.

In 1866, 400 tons of the product were horseshoe.

Scrap iron only is used. About 30 men are employed.

ELMIRA ROLLING MILL, Elmira. Elmira Rolling Mill Company: Asher Tyler, President; Simeon Benjamin, Vice-President; H. W. Rathbone, Treasurer and Secretary; D. W. Samuel, Superintendent. Built in 1860–1; and commenced re-rolling rails in May, 1861. Puddling began in September, 1864, and the making of merchant bar in December of the same year.

Product of the mill is chiefly in rails, which are now (Jannary, 1867) made of about 30 per cent. puddled iron, and the balance old rails. A considerable quantity of merchant bar from scrap is also made. It is used principally by railroads. Annual capacity of mill for rails about 15,000 tons, and for merchant bar 5000 tons; total, 20,000 tons. Average production of rails, since 1862, about 13,500 tons per annum. In 1865, about 3000 tons merchant bar were made; and in 1866 about 4000 tons.

Works are located between the railroad and canal, and have excellent facilities for transportation. The rail and bar mills are in different buildings. There are 4 double and 1 single puddling furnaces, 10 heating furnaces, 7 in rail and 3 in bar mill, 4 trains of rolls in rail, and 3 in bar mill, 1 Burden squeezer, and 6 engines. The largest engine in each mill is upright, and has a 30-inch cylinder, and 36-inch stroke. There are two upright engines of about 60 horse power, and 1 horizontal of the same size, also 1 small horizontal. Three of the engines are in each mill.

The peculiarity of the mill is that "escape heat" is not employed for heating the boilers. There is a nest of boilers for each mill, heated by a special fire. There are six parallel cylindrical boilers, without flues, in each nest. Boilers are 30 feet long and 4 feet in diameter. Superintendent of mill is a strong advocate of this arrangement.

Coal is from Towanda. It is mined on property belonging to the Company. Until recently, Blossburg coal was used. About 20,000 tons per annum are consumed.

Pig iron is chiefly from Scranton. Scrap is mostly bought in this section.

Soapstone, and no ore, is used in puddling furnaces.

BUFFALO IRON AND NAIL COMPANY, Pratt & Co., Lessees, are situated at Black Rock on the Niagara River, about four miles from the N. Y. C. R.R. Depot, Buffalo. Post-office, Buffalo.

Hodgkins & Co. built this mill in 1847. At first it was a small concern, containing only 2 puddling and 1 heating furnace, and making merchant iron. Soon after, a few nail machines were added. In 1858 the works passed into the hands of Pratt & Co., and gradually increased in extent and importance. June 27, 1865, they burned down, but rebuilding commenced at once, and on August 22d a small portion of the establishment was again in operation. The works are not yet (June, 1867) entirely rebuilt, but are being pushed forward toward completion. It is designed to make them larger than ever before. They are to contain 22 puddling and 7 heating furnaces, and 7 trains of rolls. The water and rail facilities for transportation are excellent.

Product of the works is in merchant iron, cut nails, horseshoes, boat and railroad spikes, &c.

The works as now in operation, contain 16 single puddling furnaces, 6 heating furnaces, 6 trains of rolls, 1 hammer, 1 Burden squeezer, 8 engines, and 3 steam pnmps, 2 horseshoe machines, 3 spike machines, and 29 nail machines.

The larger engines are horizontal. The largest is of 6 feet stroke, and 30-inch cylinder. It drives the puddle rolls. There are two engines of 5 feet stroke and 24-inch cylinder. Steam is furnished by 20 cylindrical boilers, 24 and 30 feet long, and 36 inches in diameter, heated by "waste heat." The number of boilers will be increased. There are to be 7 trains of rolls: one 15 inch for merchant iron, one 15 inch for nail plate, one 17 inch scrap train, one 16 inch double muck train, two 8 inch for guide iron, and one (to be built) for plate and sheet iron. The hammer is a Kirk of about 1100 ponnds. It is sometimes used for puddle balls.

In the works anthracite and charcoal pig, old car-wheels, and wrought scrap are consumed.

Merchant iron is made chiefly from anthracite pig. Lake Superior charcoal pig is used for horseshoes. There are two Perkins's patent machines.

Nail plate is made from anthracite pig. Pittsburgh and Bridgewater machines are employed.

Scrap rod is used for railroad spikes, which are made by Burden's machine.

Coal is chiefly bituminous, from Erie. It comes 90 miles by lake, and to Erie about the same distance by rail. Some Blossburg bituminous coal is employed; also some anthracite dust from the Fletcher Furnace. Anthracite is used for heating nail plate, &c.

Lake Superior ore is used for repairing the puddling furnaces. It is stamped. There are two sets of stamps, 3 in each.

The Fletcher Furnace, leased by the same parties, furnishes a large portion of the iron consumed in the works. It is located on the Niagara River, about three-quarters of a mile below the mill. It uses Lake Superior, Lake Champlain, and Clinton (Oneida Co., N. Y.), ore, rolling-mill cinder, limestone from neighborhood, and Scranton and Lehigh coal. It produces over 20 tons per day. Two tons of coal, and less than two tons of ore and cinder are consumed to one ton of iron. Coal comes from Elmira by canal.

Furnace was built in 1864; it is 46 feet high, and 13½ feet across the boshes.

BUFFALO UNION IRON WORKS. Charles F. Wadsworth, President; G. R. Wilson, Vice-President; George Beals, Secretary and Treasurer.

Manufacture pig iron, railroad iron, bar iron, and wrought iron beams.

Until the summer of 1866, the style of the firm was Palmer, Wadsworth & Co.

Works are situated on Buffalo Creek, near the Lake, about 2 miles south of the New York Central Depot. Broad and narrow gauge tracks pass through the works, and the creek affords excellent facilities for water transportation. Wharfage front, over 3000 feet. The Erie Canal terminates at Buffalo.

The real estate comprises 53 acres, on which are erected 3 anthracite blast furnaces, an immense rolling mill and its connecting buildings, and 84 tenement houses for the occupancy of the workmen.

The blast furnaces are 50 feet high, two of them 14 feet, and one 16 feet in the boshes. Air at about 800° is driven at a pressure averaging about 6 pounds by vertical engines. Boilers are on the ground, and gases are brought down to them.

In 1864, two of the furnaces ran through the year, and the third 6 weeks; in all, 110 weeks. 18,623 tons of pig iron were produced, with a consumption of 12,657 tons red oxide from Lake Superior; 7856 tons Lake Champlain magnetic; 4847 tons Clinton, Oneida County, fossiliferous; 1684 tons Ohio carbonate; 121 tons Canada magnetic (from back of Kingston), and 4780 tons rolling-mill cinder, 10,182 tons limestone, and 35,703 tons anthracite coal from Pittston and Scranton.

Average yield of ore and cinder, about 59 per cent.; consumption of coal, something under 2 tons.

One furnace was built in 1861, one in 1862, and one in 1864–5.

Made in	1861	1862	1863	1864	1865	1866
Tons of 2000 lbs. .	3835	13,590	15,360	18,623	13.278 In 87¼ weeks.	17,957

Consumed in 1866, 34,248 tons of ore, 34,448 tons of coal, and 12,735 tons of limestone.

Capital invested in the furnaces, $400,000.

The rolling mill was commenced in 1862, and finished in 1864. It commenced running in 1863. On December 17, 1866, it was much injured by fire. The roof was destroyed and much other damage done. A portion of the mill, however, was soon again in operation, and the whole will be restored shortly, with an iron roof, perfectly fireproof. We describe it as it was before the fire.

The mill is an immense one, covering some 2 acres of ground. It is built substantially. It contains 14 double puddling and 15 heating furnaces, 1 Burden squeezer, 1 hammer, 5 trains of rolls, and 19 steam engines. The plan pursued is to use a number of engines of moderate size, and avoid long shafting and belting. The engines are of the following sizes:

3	of	44-in.	cylinder,	and	39-in.	stroke.	1	of	9-in.	cylinder, and 5-inch stroke.
1	"	24	"	"	24	"	1	"	12	" " 10 "
3	"	18	"	"	12	"	1	"	8	" " 10 "
3	"	8	"	"	10	"	1	"	10	" " 36 "
3	"	7	"	"	6	"	1	"	4	" " 5 "
1	"	8	"	"	8	"				

The engines are all (except one small one) vertical. They were chiefly built by the Shephard Iron Works of Buffalo. Two of the trains are of 21 in., one of 19 in., one of 12 in., and one of 8 in. The hammer is a Nasmyth, weighing about 1½ tons.

There are 29 boilers, of different sizes, placed over the furnaces; besides these, there is a nest of 6 auxiliary boilers, to be used in case of necessity. There is also a locomotive boiler for starting up the fires.

The works run from Monday night to Saturday night.

Product of mill is in rails, bar iron, wrought-iron beams, channel iron, angle iron, rolled shafting, fish plates, &c.

Rounds are made up to 6½ inches. For rolling large iron, wrought-iron rolls are used and preferred for beams of extra size.

Iron consumed is pig, old rails, and wrought scrap. The flanges of old rails are cut before piling by a machine invented here.

Lake Champlain ore is used in puddling furnaces.

Coal used is chiefly Blossburg and Erie.

In 1863 the product of the mill was 7117 tons. In 1864 the product was 19,136 tons, 17,563 tons of which were rails, and 1573 were bar. The value of these products was $2,000,000. The consumption during the same year was 21,436 tons bituminous, and 6482 tons anthracite coal, 12,289 tons pig, 13,248 tons old rails, and 243 tons ore. In 1865, 19,212 tons were produced.

In 1866 there were produced 1371 tons new rails, 9412 tons re-rolled, 1792 tons beams and channel iron, 5465 tons merchant bar, and 457 tons fish plates; total, 18,497.

The consumption in 1866 was 11,128 tons pig, 12,775 tons old rails, 925 tons scrap, 27,083 tons coal, and 3074 tons ore.

About 800 hands are employed. Total capital of the Company is $1,000,000—$600,000 of which is represented by the mill.

[For the exclusive use of the members of the American Iron and Steel Association.]

IRON WORKS IN NEW YORK.

TABLE OF FORGES.

A TABLE showing the name, owner, location, date of erection; number of forge fires, number of bloomary fires, AND *number of each in use in* 1864; *number of hammers; quantity and kind of power used. Production in* 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, *and* 1866. *Quantity of Iron and Fuel consumed in* 1864. *Present capacity. Capital invested, &c.*

No.	NAME OF WORKS.	OWNERS AND LESSEES, OR PRINCIPAL OFFICERS.	LOCATION AND POST-OFFICE.	Date of Erection.	Number of Forge Fires.	Number in use in 1864.	No. of Bloomary Fires.	Number in use in 1864.	Number of Hammers.	POWER. Water Wheels.	Steam. Engines.	Steam. Diam. of Cylinder. (Inches.)	Steam. Stroke of Piston. (Inches.)
	LAKE CHAMPLAIN DISTRICT.												
1	Wood, Palmer & Co.,	Wood, Palmer & Co.,	Wood's Falls, Clinton Co,,	1863	0	0	4	4	1	3	0	0	0
2	Weston Forge,	E. C. Merchant and others,	Plattsburg, Clinton Co ,	1846*	0	0	4	4	1	3	0	0	0
3	Stone Forge,	Nichols, Hull & Co.,	10 m. W. of Plattsburg, Clinton Co.	1840*	0	0	4	4	1	2	0	0	0
4	Dannemora Forge,	State of New York,	State Prison Yard, Dannemora, Clinton Co.	1853	0	0	10	8	2	0	2	24 16	60 42
	Elsinore Forge,	*Abandoned,*	11½ m. W. of Plattsburg, Clinton Co. P.O., Cadyville.	1845	..	..	..	..	..	..	..	..	..
5	Platt's Forge,	S. F. Vilas,	17 m. W. of Plattsburg, Clinton Co. P.O., Saranac.	1845	0	0	3	3	1	2	0	0	0
6	Russia Iron Works, No. 1,	Bowen & Williams,	18 m. W. of Plattsburg, Clinton Co. P.O., Saranac.	1844	0	0	4	4	1	2	0	0	0
7	" " No. 2,	D. H. Parsons & Co.,	18 m. W. of Plattsburg, Clinton Co. P.O., Saranac.	1845	0	0	4	4	1	3	0	0	0
8	Star Iron Works,	Bowen & Williams,	Saranac Forks, Clinton Co. P.O.. Clayburgh.	1844	0	0	4	4	2	6	0	0	0
9	Tremblay's Forge,	Peter Tremblay,	¾ m. above Saranac Forks, Clinton Co.	1864–5	0	0	4	0	1	2	0	0	0
10	Merchant's Forge,	Chauncey Turner,	½ m. W. of Schuyler Falls, Clinton Co.	1844*	0	0	2	2	1	2	0	0	0
11	Norrisville Forge,	Albert Norris,	2½ m. W. of Schuyler Falls, Clinton Co. P.O., Schuyler Falls.	1857	0	0	2	2	1	5	0	0	0
12	Upper Norrisville Forge,			1822	0	0	3	3	1				
13	Honsinger's Forge,	Bowen & Williams, *Owners.* A. W. Honsinger, *Agent.*	4 m. S.W. of Norrisville, Clinton Co. P.O., Peasleville.	1845	0	0	3	3	1	1	1	10	24
14	Clintonville (lower) Forge,	Peru Steel and Iron Co. Charles Bliven, *Prest.* Wm. H. Gunther, *Treas.* J. L. M. Taylor, *Manag.* N. Y.	Clintonville, Clinton Co.,	1837*	0	0	16	12	7	9	0	0	0
15	" (upper) Forge,			1847*	0	0	4	4	1	2	0	0	0
	New Sweden Forge,	*Abandoned,*	2 m. W. of Clintonville, Clinton Co.,	1822	..	..	..	..	..	.	..	..	..
16	Lower Black Brook Forge,	J. Rogers & Co.,	4 m. N.W. of Ausable Forks, Clinton Co.	1832	0	0	8	8	3	5	0	0	0
17	Upper " "			1832	0	0	4	4					
18	Sable Iron Works,	J. & J. Rogers,	Ausable Forks, Essex Co.,	1848	0	0	4	4	1	1	0	0	0
19	Jay Forge,	Rogers & Co.,	6 m. S. of Ausable Forks, Essex Co.,	1809	0	0	5	4	1	2	0	0	0
20	Wilmington Forge,	Frederick Nye, *Manag.*,	12 m. from Ausable Forks, Essex Co. P.O., Wilmington.	old.	0	0	2	0*	1	2	0	0	0
	Highland Forge,	*Abandoned,*	7 m. S. of Keeseville, Essex Co.,	1837*	..	..	..	..	..	..	..	..	..
21	Willsborough Forge,	B. Noble, *Owner.* J. M. Ferris, *Manag.*	Willsborough Falls, Essex Co. P.O., Essex.	1800*	0	0	4	4	1	2	0	0	0
22	Stower's Forge,	Wm. H. Stower, *Owner & Manag.*	6 m. N.E. of Elizabethtown, Essex Co. P.O., Lewis.	1837*	0	0	3	2	1	3	0	0	0
	Wilder's Forge,	*Abandoned,*	4 m. N. of Elizabethtown, Essex Co.,	1835*	..	..	..	..	..	..	..	..	..
	Whallonsburg Forge,	*Abandoned,*	4 m. S.W. of Essex. Essex Co.,	1843*	..	..	..	..	..	..	..	..	..
23	Westport Forge,	Wm. P. & P. D. Merriam,	4 m. N. of Westport. Essex Co. P.O., Westport.	1845*	0	0	3	3	1	2	0	0	0
	Total, carried forward,				0	0	104	90	32	59	3		

* Estimated.

Entered according to Act of Congress, in the year 1866, by HENRY MCALLISTER, JR., in the Clerk's Office of the District Court of the United States for the Eastern District of Pennsylvania.

IRON WORKS IN NEW YORK.

TABLE OF FORGES.

A TABLE showing the name, owner, location, date of erection; number of forge fires, number of bloomary fires, AND *number of each in use in* 1864; *number of hammers; quantity and kind of power used. Production in* 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, *and* 1866. *Quantity of Iron and Fuel consumed in* 1864. *Present capacity. Capital invested, &c.*

NAME OF WORKS.	CONSUMED IN 1864. Fuel. Anthracite Coal. Tons of 2000 lbs.	Fuel. Bituminous Coal. Tons of 2000 lbs.	Fuel. Charcoal. Bushels.	Iron. Pig.	Iron. Blooms & Scrap.	Ore.	PRODUCTION. (In Tons of 2000 lbs.) 1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
LAKE CHAMPLAIN DIS'CT.																			
Wood, Palmer & Co., .	0	0	286,000	0	0	2,172	0	0	0	0	0	0	0	0	0	0	1,086	1,240	1,160
Weston Forge, . . .	0	0	168,000	0	0	1,120	336	336	336	250	100	0	0	0	75	450	560	560	370
Stone Forge, ...	0	0	225,000	0	0	1,500	672	27	0	0	0	100	0	0	0	330	750	1,000	1,100
Dannemora Forge, . .	0	0	672,000	0	0	4,480	200	1,120	2,240	3,000	3,000	3,000	3,000	2,500	2,000	2,240	2,240	2,900	3,100
Elsinore Forge, . . .	0	0	168,000	0	0	1,320	616	448	700	440	927	910	770	400	750	880	660	168	0
Platt's Forge, . . .	0	0	150,000	0	0	1,000	872	872	872	600	0	300	300	400	300	400	500	500	600
Russia Iron Works, No. 1,	0	0	350,000	0	0	2,100	800	500	0	0	600	1,120	1,120	1,120	1,000	1,320	1,200	1,200	1,400
" " No. 2,	0	0	240,000	0	0	1,600	560	560	560	560	450	560	560	560	600	800	800	800	1,100
Star Iron Works, . . .	0	0	300,000	0	0	2,315	466	605	673	600	700	550	725	330	480	630	1,100	1,000	1,100
Tremblay's Forge, . .	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	400	700
Merchant's Forge, . .	0	0	120,000	0	0	800	200*	140	258	300	200*	100*	100	0	400	400	400	450	350
Norrisville Forge, . .	0	0	166,843	0	0	1,200	0	0	0	583	512	450	510	376	354	643	611	650	750
Upper Norrisville Forge,							525	595	298										
Honsinger's Forge, . .	0	0	200,000*	0	0	1,300	224	224	112	420	370*	268	918	70	0	400	650	600	600
Clintonville (lower) F'ge,	0	0	815,000	0	50*	5,256	1,755	2,659	2.043	2,660	1,854	2,163	2,605	1,213	1,185	2,107	2,628	2,411	2,800
" (upper) "																			
New Sweden Forge, . .	0	0	0	0	0	0	311	0	0	0	0	0	0	0	0	0	0	0	0
Lower Black Brook F'ge,	0	0		0	0					2,112	1,679	2,306	2,537	2,471	2,360	2,591	2,502		
Upper " "	0	0		0	0		2,653	3,167	2,746	1,135	1,205	734	1,070	1,042	838	1,004	988	2,803	3,360
Sable Iron Works, . .	0	0	1,550,000	0	0	10,660	971	1,191	1,144	836	1,000	1,225	1,306	1,032	1,257	2,492	2,417	973	1,224
Jay Forge, ...	0	0		0	0		560	560	336	0	56	112	168	0	0			1,202	1,229
Wilmington Forge, . .	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60*	220*
Highland Forge, . . .	0	0	0	0	0	0	112	112	112	0	0	0	0	0	0	0	0	0	0
Willsborough Forge, . .	0	0	280,000	0	0	2,200	1,120	1,120	928	300	0	0	0	0	0	300	1,000	1,000	1,000
Stower's Forge, . . .	0	0	78,000*	0	0	775	672	684	851	360	445	436	448	341	294	343	312	325	700*
Wilder's Forge, . . .	0	0	0	0	0	0	560	560	560	450	400	0	0	0	0	0	0	0	0
Whallonsburg Forge, .	0	0	0	0	0	0	100*	100*	100*	0*	0	0	0	0	0	0	0	0	0
Westport Forge, . . .	0	0	80,000	0	0	630	416	409	553	411	478	431	442	340	295	343	312	333	450
Total, carried forward,	0	0	5,848,843	0	50	40,428	14,701	15,989	15,422	15,017	13,976	14,765	16,579	12,195	12,188	17,673	20.716	20,575	23,313

* Estimated.

IRON WORKS IN NEW YORK.

TABLE OF FORGES.

A TABLE showing the name, owner, location, date of erection; number of forge fires, number of bloomary fires, AND *number of each in use in* 1864; *number of hammers; quantity and kind of power used. Production in* 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, *and* 1866. *Quantity of Iron and Fuel consumed in* 1864. *Present capacity. Capital invested, &c.*

NAME OF WORKS.	Utmost Annual (Present) Capacity. (Tons of 2000 lbs.)	Capital invested.	Weeks in operation in 1864.	PRODUCTION IN 1864. (In Tons of 2000 lbs.) Blooms.	Bars.	Axles, Tires, Shafts, and other Forgings.	REMARKS.
LAKE CHAMPLAIN DISTRICT.							
Wood, Palmer & Co., . .	1,400	$———	33*	1,036	50	0	Blooms from ore.
Weston Forge, ...	1,400	$———	30*	560	0	0	Blooms from ore.
Stone Forge, ...	1,400	$———	40*	750	0	0	Blooms from ore.
Dannemora Forge, . . .	3,400	$———	49*	2,240	0	0	Blooms from ore. Nails and horseshoe iron are made from blooms.
Elsinore Forge, ...	. . .	$———	30*	660	0	0	Blooms from ore were made up to 1866, when Forge was abandoned.
Platt's Forge, ...	1,000	$———	35*	500	0	0	Blooms from ore.
Russia Iron Works, No. 1,	1,600	$80,000	50	1,200	0	0	Blooms from ore.
" " No. 2,	1,500	$———	40*	800	0	0	Blooms from ore.
Star Iron Works, ...	1,350	$80,000	46	1,100	0	0	Blooms from ore. Formerly Myers Forge.
Tremblay's Forge, . . .	1,350	$———	0	0	0	0	Blooms from ore.
Merchant's Forge, . . .	500	$———	25*	400	0	0	Blooms from ore.
Norrisville Forge, . . .	1,250	$———	40	611	0	0	Blooms from ore.
Upper Norrisville Forge, .							Blooms from ore.
Honsinger's Forge, . . .	900	$———	46	650	0	0	Blooms from ore.
Clintonville (lower) Forge,	5,500	$800,000	44	2,628	0	0	Blooms from ore. Rolling Mill in connection.
" (upper) "							
New Sweden Forge, . .	. . .	. . .	0	0	0	0	*Abandoned about* 1855.
Lower Black Brook Forge,	7,500	$———	50	4,978	0	0	Blooms from ore. Rolling Mill and Nail Factory in connection.
Upper " "							
Sable Iron Works, . . .							
Jay Forge, ...							
Wilmington Forge, . . .	500	$———	0	0	0	0	Blooms from ore.
Highland Forge, . . .	. . .	. . .	0	0	0	0	*Abandoned about* 1857.
Willsborough Forge, . .	1,200	$150,000	36	1,000	0	0	Blooms and slabs from ore.
Stower's Forge, ...	900	$———	26	312	0	0	Blooms and slabs from ore.
Wilder's Forge, . . .	. . .	. . .	0	0	0	0	*Abandoned about* 1860.
Whallonsburg Forge, . .	. . .	. . .	0	0	0	0	*Abandoned about* 1856.
Westport Forge.	950	$———	26	312	0	0	Blooms from ore.
Total, carried forward,	33,600	$		19,737	50	0	

* Estimated.

IRON WORKS IN NEW YORK.

TABLE OF FORGES—*Continued.*

No.	NAME OF WORKS.	OWNERS AND LESSEES, OR PRINCIPAL OFFICERS.	LOCATION AND POST-OFFICE.	Date of Erection.	Number of Forge Fires.	Number in use in 1864.	Number of Bloomary Fires.	Number in use in 1864.	Number of Hammers.	POWER. Water Wheels.	POWER. Steam. Engines.	POWER. Steam. Diam. of Cylinder. (Inches.)	POWER. Steam. Stroke of Piston. (Inches.)
	Brought forward, ...	. . . . .	. . . . .	. . .	0	0	104	90	32	59	3	. .	. .
24	Valley Forge, ...	Essex and Lake Champlain Ore and Iron Company,	Elizabethtown, Essex Co., . . .	1845	0	0	6	4	1	1	1	10*	30*
25	Kingdom Forge, ...		6 m. S.E. of Elizabethtown, Essex Co. P.O., Elizabethtown.	1825	0	0	6	4	1	1	1	10*	30*
26	New Russia Forge, ...	E. H. & H. A. Putnam, ...	4 m. S. of Elizabethtown, Essex Co. P.O., Elizabethtown.	1802*	0	0	4	4	1	2	1	12	24
	Dead Water Forge, . . .	*Abandoned,*	13 m. S. of Elizabethtown, Essex Co.,	1846	. .	. .	. .	. .	. .	. .	. .	. .	. .
	North Hudson Forge, . . .	*Abandoned,*	18 m. S. of Elizabethtown, Essex Co.,	1848	. .	. .	. .	. .	. .	. .	. .	. .	. .
27	Schroon River Iron Works, .	John Roth, *Owner,*	1 m. S.W. of Root's Tavern, Es'x Co. 24 m. S.S.W. of Elizabethtown.	1857	0	0	4	4	1	2	0	0	0
28	Paradox Iron Works, . . .	John Roth, *Owner,*	Head of Paradox Lake, Essex Co. P.O., Schroon River.	1864	0	0	2	2	1	2	0	0	0
29	Irondale Iron Works, . . .	Penfield, Harwood & Co., . . .	6 m. W. of Crown Point, Essex Co. P.O., Crown Point.	1828	0	0	4	4	2	2	0	0	0
30	Ticonderoga Iron Co., . . .	Ticonderoga Iron Co., *Owners.* Burlington Manuf'g Co., *Lessees.*	Ticonderoga, Essex Co., ...	1864–5	0	0	6	0	2	3	0	0	0
	West Fort Ann Forge, No. 1,	*Abandoned,*	5 m. W. of Fort Ann Village, Washington Co.	1802*	. .	. .	. .	. .	. .	. .	. .	. .	. .
	West Fort Ann Forge, No. 2,	*Abandoned,*	5¼ m. W. of Fort Ann Village, Washington Co.	1828	. .	. .	. .	. .	. .	. .	. .	. .	. .
	NORTHWESTERN DISTRICT.												
31	Brasher Iron Works, . . .	I. W. Skinner & Co., ...	Brasher Iron Works Village, St. Lawrence Co.	1835	1	1	1	1	1	2	0	0	0
	Brasher Centre Forge, . .	*Abandoned,*	Brasher Centre, St. Lawrence Co., .	1849	. .	. .	. .	. .	. .	. .	. .	. .	. .
32	*Fullerville Iron Works,* . .	*Abandoned,*	9 m. S.E. of Gouverneur, St. Lawrence Co. P.O., Fullersville.	1826	. .	. .	. .	. .	. .	. .	. .	. .	. .
33	Sterlingville Forge, . . .	C. Essington, *Owner.* J. Essington, *Lessee.*	Sterlingville, Jefferson Co., . . .	1839	2	2	0	0	1	2	0	0	0
34	Jefferson Nail Works, . . .	M. N. Gardner & Co., *Lessees,* . .	Carthage, Jefferson Co., ...	18—	2	2*	0	0	1	1	0	0	0
	NEW YORK CITY DISTRICT.												
35	West Point Foundry, . . .	R. P. Parrott, *Lessee.* G. Paulding, *Ass't.*	Cold Spring, Putnam Co., . . .	1839	19	19	0	0	5	0	1	16	24
	Ramapo Iron and Steel Works,	*Abandoned,*	Ramapo, Rockland Co., ...	1800*	. .	.	. .	. .	. .	. .	. .	. .	. .
	Suffern's Forge, ...	*Now a Rolling Mill,*	Suffern's. Rockland Co., ...	1849*	. .	.	. .	. .	. .	. .	. .	. .	. .
	Valley Forge, ...	*Abandoned,*	New York City, ...	1856	. .	. .	. .	. .	. .	. .	. .	. .	. .
36	Franklin Forge, ...	Tugnot, Dally & Co., ...	New York City, ...	18—	2	2	0	0	4	0	3	12 12 12	36 36 24
	Atlas Forge, ...	*Abandoned,*	New York City, ...	1863	. .	. .	. .	. .	. .	. .	. .	. .	. .
	BUFFALO DISTRICT.												
37	Franklin Forge, ...	Drullard & Hayes, ...	Buffalo, Erie Co., ...	1861	4	2	0	0	2	0	1	10	12
38	Niagara Forge Works, . .	Patchin & Delaney, ...	Buffalo, Erie Co., ...	1853	8	8	0	0	4	0	2	16 9	24 16
39	Buffalo Steam Forge Co., . .	Moore & Childs, ...	Buffalo, Erie Co., ...	1863–4	4	3	0	0	2	0	1	10	30
	Total, ...	. . . . .	. . . . .	. .	42	39	137	113	61	77	14		

* Estimated.

IRON WORKS IN NEW YORK.

TABLE OF FORGES—*Continued.*

NAME OF WORKS.	CONSUMED IN 1864. Fuel. Anthracite Coal. Tons of 2000 lbs.	Fuel. Bituminous Coal. Tons of 2000 lbs.	Fuel. Charcoal. Bushels.	Iron. Pig.	Iron. Blooms & Scrap.	Iron. Ore.	PRODUCTION. (In Tons of 2000 lbs.) 1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Brought forward, . .	0	0	5,848,843	0	50	40,428	14,701	15,989	15,422	15,017	13,976	14,765	16,579	12,195	12,188	17,673	20,716	20,575	23,313
Valley Forge, ...	0	0	120,000	0	0	800	500*	500*	500*	300*	300*	400*	550	550	550	550	400	450	1,050
Kingdom Forge, ...	0	0	30,000	0	0	200	112	100	150	100	100	0	0	0	0	100	100	650	750
New Russia Forge, . . .	0	0	300,000	0	0	2,400	358	392	476	300	300	300	350	400	600	1,200	1,000	675	675
Dead Water Forge, . . .	0	0	0	0	0	0	350*	350*	300*	0	0	0	0	0	0	0	0	0	0
North Hudson Forge, . .	0	0	0	0	0	0	350*	350*	225*	75	0*	0	0	0	0	0	0	0	0
Schroon River Iron Works, .	0	0	270,000	90	0	1,800	0	0	0	0	100	100	100	100	300	900	900	600	250
Paradox Iron Works, . . .	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300	300
Irondale Iron Works, . . .	0	0	90,000	0	0	700	560	560	560	355	320	400	450	440	240	450	340	300	300
Ticonderoga Iron Co. . . .	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	450	300
West Fort Ann Forge, No. 1,	0	0	0	0	0	0	28	17	13	0*	0	0	0	0	0	0	0	0	0
West Fort Ann Forge, No. 2,	0	0	0	0	0	0	45	17	45	10*	0	0	0	0	0	0	0	0	0
NORTHWESTERN DISTRICT.																			
Brasher Iron Works, . . .	0	0	17,449	0	49	78	56	56	84	0	0	15	24	56	30	27	75	100	50
Brasher Centre Forge, . .	0	0	0	0	0	0	45	34	39	20*	0	0	0	0	0	0	0	0	0
Fullerville Iron Works, . .	0	0	0	0	0	0	56	56	56	30*	20*	10*	10*	0*	0	0	0	0	0
Sterlingville Forge, . . .	0	0	5,000	20	10	0	45	45	45	20	20	20	20	20	20	20	20	20	20
Jefferson Nail Works, . . .	0	0	17,500*	70*	30*	0	168	168	168	80*	60*	70*	70*	60*	60*	70*	70*	70*	70*
NEW YORK CITY DISTRICT.																			
West Point Foundry, . . .	3000	1000	0	0	1000	0	400	230	350	400	230	200	250	300	550	800	800	800	600
Ramapo Iron & Steel Works,	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
Suffern's Forge, ...	0	0	0	0	0	0	350	350	150	0	0	0	0	0	0	0	0	0	0
Valley Forge, ...	250	0	0	0	75	0	0	0	0	50	50	50	50	50	50	50	50	50	25
Franklin Forge.	2500*	1000*	0	0	2500	0	300*	300*	300*	300*	250*	350*	300*	450*	700*	1,200*	2,000*	1,300*	600*
Atlas Forge, ...	250*	0*	0	0	75	0	0	0	0	0	0	0	0	0	0	25*	50*	25*	0
BUFFALO DISTRICT.																			
Franklin Forge, ...	0	40	0	0	40	0	0	0	0	0	0	0	0	15	30	30	30	175	175
Niagara Forge Works, . .	0	2000	0	0	650	0	150*	150*	150*	100*	75*	125*	100*	150*	200*	300*	500*	500*	450*
Buffalo Steam Forge Co., .	0	600	0	0	285	0	0	0	0	0	0	0	0	0	0	0	250	500	500
Total, ...	6000	4640	6,698,792	180	4764	46,406	18,674	19,664	19,033	17,157	15,801	16,805	18,853	14,786	15,518	23,395	27,301	27,540	29,428

* Estimated.

IRON WORKS IN NEW YORK.

TABLE OF FORGES—*Continued.*

NAME OF WORKS.	Utmost Annual (Present) Capacity. (Tons of 2000 lbs.)	Capital invested.	Weeks in operation in 1864.	PRODUCTION IN 1864. (In Tons of 2000 lbs.) Blooms.	Bars.	Axles, Tires, Shafts, and other Forgings.	REMARKS.
Brought forward, . .	33,600	. . .	. .	19,737	50	0	
Valley Forge, ...	1,500	$———	25	400	0	0	Blooms from ore.
Kingdom Forge, ...	1,500	$———		100	0	0	Blooms from ore.
New Russia Forge, ...	1,500	$———	34	1,000	0	0	Blooms and slabs from ore.
Dead Water Forge, . . .	. . .	. . .	0	0	0	0	*Abandoned about* 1857.
North Hudson Forge, . . .	. . .	. . .	0	0	0	0	*Abandoned in* 1857.
Schroon River Iron Works, .	1,350	$———	40	900	0	0	Blooms from ore.
Paradox Iron Works, . . .	600	$———	8	0	50	0	Blooms and bars from ore.
Irondale Iron Works, . . .	1,000	$30,000	22	240	100	0	Blooms and slabs from ore.
Ticonderoga Iron Co., . . .	1,500	$———	0	0	0	0	Blooms from ore.
West Fort Ann Forge, No. 1,	. . .	. . .	0	0	0	0	*Abandoned about* 1858.
West Fort Ann Forge, No. 2,	. . .	. . .	0	0	0	0	*Abandoned about* 1858.
NORTHWESTERN DISTRICT.							
Brasher Iron Works, . . .	200	$———	40	69*	6*	0	Finished bar iron, blooms, shapes, &c., from scrap and some ore.
Brasher Centre Forge, . . .	. . .	. . .	0	0	0	0	*Abandoned about* 1858.
Fullerville Iron Works, . .	. . .	$———	0	0	0	0	*Abandoned about* 1861.
Sterlingville Forge, . . .	125	$———	27	0	20	0	Bars, used chiefly for edge tools, from pig and scrap.
Jefferson Nail Works, . . .	. . .	$———	30*	70*	0	0*	Blooms from pig and scrap, rolled into nail plate, &c.
NEW YORK CITY DISTRICT.							
West Point Foundry, . . .	1,500	$80,000	51*	0	0	800	Ordnance, shafting, and other heavy forgings.
Ramapo Iron and Steel Works,	. . .	. . .	0	0	0	0	*Abandoned about* 1856.
Suffern's Forge, ...	. . .	. . .	0	0	0	0	*Now a Rolling Mill.*
Valley Forge, ...	. . .	$———	0	0	0	50	*Abandoned about* 1866.
Franklin Forge, ...	2,200	$———	50*	0	0	2,000*	Heavy forgings, especially for marine engines.
Atlas Forge, ...	. . .	. . .	0	0	0	50	*Abandoned.*
BUFFALO DISTRICT.							
Franklin Forge, ...	300	$———	30*	0	0	30*	Car axles and general forgings from scrap. Formerly made oil-well tools, &c.
Niagara Forge Works, . .	700	$———	0	0	0	500	Railroad work and heavy forgings.
Buffalo Steam Forge Co., .	650	$———	26*	0	0	250	Car axles, wagon axles, and general forgings.
Total, ...	48,225			22,516	226	3,680	

* Estimated.

FORGES IN NEW YORK.

The forges of New York may be divided geographically into four groups, viz., the Lake Champlain group, the Northwestern group, the New York city group, and the Buffalo group.

The Lake Champlain group embraces 30 Catalan forges, containing 136 fires, and located among the rich magnetic beds of Clinton and Essex counties. The product of these forges finds its market among the steel and wire works, the nail factories and the boiler-plate mills of various sections of the country.

The process of making wrought iron direct from ore being somewhat uncommon in other districts, it may be interesting to briefly note a few facts with regard to it.

The fires are built of cast iron, and generally about 32 inches square and 13 inches deep. Above this cavity the fire is open in front, and closed on the sides and rear. A stack about 22 feet high rises from each fire. The blast is heated in three arched pipes built over the fire in the stack. It enters the fire through a single tuyere at one side. The nozzle of this tuyere is ⊏ shaped, about 1½ inches on the floor, and ⅞ inch high. The shape of this nozzle varies with the character of the ore used. The fire is made with charcoal; the ore is thrown on the coal and becomes mixed through it. The cinder in a melted state goes to the bottom of the fire, and is occasionally run off, while the iron forms a "loop" which is "dug up" every three hours and shingled under a hammer. When billets for steel or wire are made, the loop after shingling is reheated (one end at a time), and drawn down to 3 or 4 inches square, the loop making 3, 4 or 5 billets. When slabs for boiler-plates are made, they are hammered out without reheating, the loop making a single slab. In slab work the "dig up" generally takes place every two hours and twenty-four minutes. In reheated iron one gross ton per fire in 24 hours is good work. In slab work about ¼ more is made. In the former about 300 bushels of charcoal—one-half hard wood and one-half soft—is consumed to the gross ton of iron; in the latter about 250 bushels. The blast pressure is largely dependent on the character of the ore, &c. It averages perhaps 1½ lbs. to the square inch; the temperature averaging about 550°. The blast is generally driven by water power, though now steam engines are not uncommon. In many forges an engine furnishes power only during low water seasons. When water is used the stack is open, and the products of combustion pass through it. When steam is used the stack is more or less closed, and the gases are burned beneath the boilers. The hammers in use are almost always water helve hammers. They are generally driven by a breast-wheel and lifted by cams under the centre. The commonest form of hammer is one having a wooden helve and a cast-iron head weighing from 1500 to 2500 lbs. The best hammers are of iron. The "Rogers" hammer is of cast-iron, weighing about 5 tons; the Peru Co.'s hammer is of wrought-iron. T cast iron dies are used on the hammers. In order to secure water power, the forges are generally located on the banks of streams.

The ore, except when very rich, is prepared for working, by roasting, stamping and sifting. The roasting is done in large kilns. About 250 tons of "chunk ore" are piled on some 15 cords of wood in a kiln, open in front and on top. A kiln burns down in about 24 hours. When the ore is burned at the forges it is generally covered with coal breeze, which greatly assists the burning. There are one or two perpetual kilns in use. After roasting, the ore is stamped and carried by water in a trough, and piled by means of elevating cups on an endless belt. From this pile it is thrown on sieves which have a jig motion. It then passes through the sieves while the gangue rises to the top. The sieve is occasionally raised, the sand on top "scraped off," and fresh ore thrown on. The ore settles in the bottom of a large trough, from which it is again raised by elevator cups, and piled ready for use. Very rich ore is generally roasted and stamped, but not sifted. Some ore may be stamped without roasting.

The supply of wood in many localities is much diminished, but among the mountains, and at a distance from Lake Champlain, it still appears to be almost unlimited. The forest in many places yields as much as 75 cords to the acre, and averages about 45 cords. The second growth advances rapidly, and will often cut 35 to 40 cords to the acre, at an age of 35 years. The hard woods used for coal are chiefly beech, birch and maple; the soft, hemlock and spruce. A small quantity of tamarack is also used, and is esteemed the best soft wood coal. The *best* mixture for making iron is about ⅓ soft, and ⅔ hard wood coal; of this mixture about 275 bushels will make a gross ton of billets. Of all beech coal, a ton can be made with about 235 bushels, and of spruce it would probably require about 425 bushels. Kilns for making coal are in very general use in this region, the commonest form of which is rectangular, built of brick, brick arch and wood frame, some 42 feet long, 14 feet wide and about 17 feet high (to the top of the arch). The dimensions are, however, variable, holding from, say, 52 to 76 cords. There are some round kilns in use. The stock of wood is obtained in winter. Many of the annoyances connected with the running of pit-coal jobs are avoided. The supply is regular. There is no trouble about covering, &c. The yield of the wood is increased about 15 per cent. Seasoned timber yielding about 50 bushels to the cord. The coal, however, is somewhat lighter than pit coal. A kiln takes 2 or 3 days to fill and about 8 or 10 days to burn down. It then remains closed about 8 days more, when it is ready for emptying, which requires 2 or 3 days. Kiln and pit coal work well together.

The manufacture of iron in this section commenced many years ago. There are scattered throughout the country the ruins of many small forges, which went out of existence as the forests surrounding them disappeared. The introduction of the hot blast about the year 1844, reduced, greatly, the consumption of fuel, and increased the product of the fires.

The iron interest in this region has been peculiarly susceptible to the fluctuations which have attended the manufacture of iron throughout the country, and the need of unvarying protective legislation is keenly felt.

The Northwestern group embraces a few small forges, making blooms and bars chiefly from scrap iron.

The New York City group embraces two or three forges making steam engine forgings, &c. There are a number of steam hammers in the machine shops of New York City, where a small amount of forgings are made.

The Buffalo group embraces three forges, doing steam engine and railroad work chiefly.

Lake Champlain District.

WOOD, PALMER & CO. Wood's Falls Station, on the Ogdensburg & Lake Champlain Railroad, Clinton County.

Forge was built in 1863, and went into operation Jan. 1864. It is a good forge.

It contains 4 fires, 1 side-lift water tilt hammer, weighing about 2 tons, and 2 water wheels. The hammer wheel is a breast of about 18 feet in diameter, and 6 feet bucket; the bellows wheel is an overshot of about 17 feet in diameter and 4 feet bucket. There is a small horizontal wheel (about 12 inches in diameter) for driving the stamps.

The water privilege is very good, both summer and winter; the head is about 22 feet.

Blooms are made from ore. Some little scrap is also worked up. Ore used heretofore

has been in part Port Heury (Old and New Bed) and in part Malone. Port Henry ore goes by water to Ronse's Point, thencc by rail to forge. Hereafter it is expected that Malone ore will be used morc largely. This ore is hauled by wagon to Malone and thence by cars. It is a rich magnetic ore. The mine has recently bcen opened, and promises well. There has heretofore been difficulty in obtaining thc ore in summer in consequence of bad roads. Two tons of ore and not quite 300 bushels cf cbarcoal are used to the ton of iron (gross). Company have 8 closed kilns—3 near the works and 5 at a distance. Five of the kilns arc round, about 32 ft. in diameter, and hold about 75 cords. The other three are rectangular, holding about 56 cords. Charcoal costs, cut on property belonging to the Company, from 6½ to 8½ cts. Make boiler slabs and a few bars. Slabs go to Philadelphia, Baltimore, Jersey City, &c.

Product in 1864, ... 1086 tons.
" 1865, ... 1333 "
" 1866, ... 1434 "
Capacity, 1400 tons slabs.

(*Saranac River Forges.*)

WESTON FORGE is on the Saranac River, ¾ of a mile from the lake. It is in the town of Plattsburg, Clinton County.

It was built about 1846; rebuilt in 1856, and again in 1862. It was owned from 1848 to 1862 by Z. N. Weston. In the latter year it was purchased by E. C. Merchant and others, the present owners.

The forge contains 4 fires, 1 water centre-lift tilt hammer, weighing about 1800 lbs., and 3 water wheels. The hammer wheel is a breast of about 10 feet in diameter, and 7 feet face. The blowing whcel is also a breast wheel. A small wheel runs a set of 6 stamps. Stamp shoes weigh about 20 lbs. Water privilege is good.

Blooms are made from ore from the Old and New Bed Mines in Moriah. It is shipped by lake from Port Henry to Plattsburg, about 60 miles, and hauled by wagon ¾ of a milc to forge. It cost about $8 per ton at forge in 1866. Charcoal comes on an average 15 miles by wagon. Some of it comes by rail about 30 miles, the Company having 4 kilns ou the Ogdensburg & Lake Champlain Railroad; its cost is about the same. In all, there are 7 kilns: 4 on railroad and 3 about 15 miles northwest of forge.

STONE FORGE is owned hy Nichols, Hull & Co. It is on the north bank of the Saranac River, below Cadyville, and 10 miles west of Plattsburg.

It was built about 1840. It was formerly owned by Eli Chittenden, and passed iuto the hands of the present parties in 1863. It was ncarly idle from 1855 to the latter date.

It contains 4 fires, 1 centre-lift water tilt hammer, weighing about 1800 lbs., and 2 breast wheels.

Ore is mostly from Port Heury. It is hauled in wagons from Plattsburg. Formerly some Dannemora ore from the State Prison Mine was used.

Charcoal is hauled from 3 to 8 miles; about 6 miles on an average; it cost from the property of the Company about 8 cts. in the fall of 1866.

The Company own about 1500 acres woodland, and have 3 coal kilns on same.

DANNEMORA FORGE is in the State Prison Yard and worked by convicts. It is about 16 miles from Plattsburg. John Parkhurst is the agent of the Prison.

Ore is obtained from an opening within the inclosure. It lies in a horizontal bed 20 to 30 feet thick, and 50 to 100 wide. It has been entered about 1000 feet. There is a small inclined plane to approach the entrance of the miue. Ore is stamped, washed, and separated in the ordinary way.

Blooms are made in the forge and rolled out into nail plate and cut into nails. A small quantity of bar iron also is made.

The forge was built in 1853. It contains 10 fires, and 2 centre-lift hammers, weighing about 1800 lbs. It is run by steam power. A horizontal steam engine of 24 inch cylinder and about 5 feet stroke is employed to run the hammers. The same euginc runs a train of rolls for rolling the blooms into nail plate. There is a second engine in use. There are 2 heating furnaces, where the escape heat from the forge fires is utilized.

The Dannemora ore is not quite equal in quality to the Port Henry ore.

Charcoal cost in 1866 about 9 cts.; it was hauled on an average about 3 miles.

Production in tons of 2000 lbs.

Made in	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
	200*	1120*	2240*	3000*	3000*	3000*	3000*	2500*	2000	2240*	2240	2900	3100

There was a blast furnace built here in 1854; it was burned down in 1856.

[*Elsinore Forge* was on the Saranac River, 11½ miles W. of Plattsburg and 1½ miles W. of Cadyville, Clinton County. It was owned by A. Williams.

It was built in 1845 and abandoncd in 1866. It contained 3 fires. The privilege has been sold to a saw-mill.

Port Henry ore was worked.]

PLATT'S FORGE is situatcd about 17 miles west of Plattsburg, on the Saranac River. It was built in 1845, and has been owned since about 1858 by S. F. Vilas, of Plattsburg.

It contains 3 forge fires, 2 breast wheels, and 1 1800 lb. watcr trip hammer.

Charcoal is hauled on an average about 4 miles.

Ore is mostly from Port Henry (Old and New Beds mixed), hauled in wagons from Plattsburg. Somc little Dannemora ore has been used, and also some Tremblay ore. The latter is hauled about 5 miles.

RUSSIA IRON WORKS, Bowen & Williams, are on the Saranac River, 18 miles W. of Plattsburg (P. O., Saranac), Clinton County.

Forge was built in 1844. It became the property of the present owners in 1863.

It contains 4 forge fires, 2 breast wheels, 1 centre-lift hammer, weighing about 1800 lbs., stamps, &c.

Charcoal is brought on an average about 3 miles, costing, cut on the property of the Forge, about 7½ cts. per bushel, in the fall of 1866.

Ore was more than one-half in 1866 from Port Henry (Old and New Beds, Pilfershire, &c.), balance from Tremblay Mine, about 3 miles distant. Ore from either locality cost in fall of 1866 about $10 per gross ton. Port Henry ore is richer than Tremblay, but latter is of much snperior quality. Bowen & Williams have recently purchased the Tremblay Mine, and now use mostly that ore, and make fine billets for steel and wire.

The Company own about 5000 acres woodland. They have 6 coal kilns, within about 3½ miles of the forge, in which about ⅔ the amount of charcoal used is manufactured.

RUSSIA IRON WORKS, No. 2 (near Russia Iron Works, No. 1), are on the Saranac River, 18 miles above Plattsburg. D. H. Parsons & Co. are the owners.

The forgc was built in 1845. It contains 4 fires, 1 1800 lb. centre-lift water trip hammer, 2 breast wheels, and a small turbine for the stamps.

Ore used is chiefly from Old and New Bed.

Charcoal is drawn about 3 miles, and cost about 7½ cts. in 1866.

Company own some 3000 to 4000 acres woodland, and have 4 coal kilns on same.

STAR IRON WORKS, known formerly as Myers Iron Works, are situated ou the W. bank of the S. branch of the Saranac River, at the forks, about 22 miles from Plattsburg. The property is now owned by Bowen & Williams.

The forge contains 4 fires.

The Myers Mine is close to the forgc. It has bcen worked for many years. It supplies tbe forge, but no ore is sold. The ore is a lean magnetic, requiring separation, as all thc ores of this section do. It takes nearly 4 tons of the product of the mine to yield 1 ton of separated ore. It is stamped and separated in the ordinary way. The prepared ore is very free from impurity, and yields an iron that is chiefly used for wire at South Easton, Pa. The vein dips at about 75°; it is about 20 feet thick, and has bcen opened and worked out to a depth of about 100 feet. It has been opened in length about 400 feet. Hoisting is done in buckets drawn up over beams.

There are 2 hammers iu the forge weighing about 1600 lbs. each. There are 2 breast wheels for the hammering, 1 breast wheel for the bellows, 1 turbine for pumping the water from mine, 1 turbine for hoisting, and a wheel for the stamps, sieves, &c. In all 6 wheels.

Charcoal is hauled about 3½ miles on an average; it cost in 1866 about 7½c. per bushel.

Company own about 10,000 acres woodland, and have 6 coal kilns, in which about ⅔ amount coal used is manufactured.

Hauling to Plattsburg cost $2 75 per ton in 1866.

TREMBLAY'S FORGE was built in 1864–5, commencing work in the latter year. It is located on the N. branch of the Saranac River, ¾ of a mile above the Forks, and about 22½ miles from Plattsburg.

It contains 4 bloomary fires, 1 1800 lb. hammer, and 2 wheels. Water privilege fair.

Charcoal is hauled on an average about 2½ miles. There are 3 kilns near forge.

Ore is from the Tremblay Mine exclusively. The mine is 2½ miles S. E. of the forge. It has been worked for about 12 years. It is now owned by Bowen & Williams.

The vein of ore is about 30 feet thick and nearly vertical. It has been sunk upon and worked clear for a depth of about 80 feet and a length of some 600 feet. The ore is separated in the ordinary way. About 2½ tons of the *run* of the mine yield 1 ton of separated ore. The annual product of separated ore for some years has averaged perhaps 4000 tons.

Billets and blooms from forge are used for wire, for steel, &c.

Forge is owned by Peter Tremblay. The Tremblay mine was sold to Bowen & Williams Dec. 1866.

A new mine is being opened.

(*Salmon River Forges.*)

MERCHANTS' FORGE (Clinton County) is on the south bank of the Salmon River, ¼ mile W. of Schuyler's Falls, and 9 miles S. W. of Plattsburg.

It was built about 1844, and has been owned since about 1863 by Chauncey Turner, Schuyler's Falls P. O.

It contains 2 fires, 1 hammer, and 2 breast wheels. Hammer weighs about 1800 lbs. Water privilege is only fair.

Charcoal cost in 1866 about 8 cts. per bushel, and was hauled about 6 miles on an average.

Orc is from Port Henry (Old and New Bed mixed). It is hauled from Port Jackson (on the lake) 12 miles by wagon.

NORRISVILLE FORGE is on the N. bank of the Salmon River, 2½ miles W. of Schuyler's Falls Village. It was built in 1822. The Upper Norrisville Forge, built in 1857, is owned by the same concern, and located a few rods farther up the stream.

The Norrisville Forge contains 3 fires, the Upper Forge 2. Each forge contains 1 hammer, and therc are in all 5 water wheels.

Orc is from Port Henry (Old and New Bed). It is hauled by wagon from Port Jackson, 14 miles.

Charcoal is hauled on an average about 6 miles. It cost in 1866 about 8 cts. per bush.

The forges are owned by Albert Norris.

The Upper Forge is built on the site of an old forge.

UPPER NORRISVILLE FORGE. (See *Norrisville Forge.*)

HONSINGER'S FORGE, Clinton County, Bowen & Williams, owners; A. W. Honsinger, agent, is situated 4 miles S. W. of Norrisville, in the village of Peaseville.

The forge was taken by tbe present owners in August, 1866. It was built about 1845, and rebuilt in 1854. The water privilege is uncertain, and an engine is used for blowing; it was put in about 1859.

There are 3 fires, 1 centre-lift tilt hammer, weighing about 1200 lbs., a breast wheel for the hammer, and tbe engine for blowing. The latter is horizontal; it has a stroke of about 2 feet, and a cylinder of about 10 inches. There are 2 blowing tubs.

Slabs and wire billets are made.

Charcoal is hauled on an average some 6 miles; it cost in 1866 about 8 cts. per bushel.

Ore is in part Port Henry and in part Tremblay. In thc winter the latter mine is readily reached at a distance of only about 7 miles. Port Henry ore is hauled from Port Jackson, 17 miles.

(*Ausable River Forges.*)

PERU STEEL & IRON CO., Chas. Bliven, President; Wm. H. Gunther, Treasurer; F. J. Dominick, Secretary (all of New York); J. L. Myers Taylor, Manager, Clintonville. The Company own two forges and a rolling mill at Clintonville, three-eighths of the well-known Palmer Hill Mine, very exteusive woodland property, &c.

The Peru Iron Co. was incorporated previous to 1826; Joshua Aiken was the agent. They owned one or more forges on the south side of the river at Clintonville, which were subsequently washed away by a freshet. There are also said to have been one or two blast furnaces hereabouts in early times. Chain cables were made at one time, and nails were made up to 1856. All this was many years ago.

The Peru Iron Co. failing, the works stopped in August, 1861. In April, 1862, Salters

& Co. took the works. ran them for three years, and then sold out to the present Company, which was incorporated April 5, 1865.

The large lower forge is about 1 mile below Clintonville, the other forge and rolling mill are in the village. Clintonville is about 6 miles from Keesville and 11 from Port Kent.

The lower forge is of stone, and has an iron roof. It contains 16 fires. 7 hammers and 8 wheels. Of the hammers 3 are iron centre-lift hammers (wrought iron helves and heads with cast iron dies), weighing about (?) lbs. These hammers are run by breast wheels of about 16 feet in diameter and 5 feet face. The other hammers have wooden helves. Two weigh about 1800 lbs. each; one weighs about 2500 lbs., and the seventh is a light blacksmith hammer of about 300 lbs. Each hammer has a breast wheel. The blowing wheel is an S (Scotch) cast iron wheel. The nozzles of the tuyeres are D shaped, seven-eighths inches high and 1½ long.

The upper forge contains 4 fires and 1 hammer. The hammer has a wooden helve, and weighs about 2800 lbs. It is run by a breast wheel of about 16 feet diameter and 5 feet face. The bellows are worked by an S (Scotch) wheel.

In the upper forge is the rolling mill. Here bar and horse-shoe iron, wire rods and nail plates are rolled. The product of the works is sold either as blooms, or as bar, according to the state of the market.

There are two heating furnaces, where the billets and piles are heated for the rolls. The fires are so arranged that the escape heat from two fires is utilized in each heating furnace. There are two other heating furnaces which are only occasionally used. In them Cumberland coal is employed. There are 3 trains of rolls; 1 for breaking down and for large bars; 1 for bar of ordinary sizes, and 1 for wire-rods; there is also a set of slitters.

The rolls are driven by 2 S (Scotch) wheels of 10 and 12 feet. Another wheel of the same kind runs a pair of shears. In all, in this building there are 6 wheels belonging to the mill and 2 to the forge.

From 1854 to 1864 inclusive, almost the whole product of the forges passed through the rolls. In 1865 about seven-eighths, and in 1866 about five eighths of the product was rolled. In converting blooms into finished merchant bar and nail plate, the loss averages about 14 1-5 per cent.

A small quantity of scrap is bought in the neighborhood. It is now used with the scrap made in the works for horseshoe iron. Formerly about 10 per cent. of scrap was put in all horseshoe and other small iron.

The Company are now making a large number of blooms for steel for Pittsburgh; they also sell a considerable quantity of bars for the same purpose.

There is still standing the ruins of an old cementing furnace where, up to 1860, a small quantity of bars were yearly converted into blister steel. The annual product was on an average perhaps 150 tons up to 1859; in 1860 probably about 50 tons were made.

The Company own three-eighths of the Palmer Hill Mine and Messrs. Rogers five-eighths. (For further account of mine see below.) The ore is separated in the ordinary way in this section. There is a separator near the lower forge. About 2¼ tons of the run of the mine yield one ton of separated ore. The separated ore yields about 50 per ct. of metal in the fire.

An ore yielding about 60 per cent. of separated ore is mined about 1 mile from Clintonville. It is not worked in large quantities. It makes a tough merchant iron. It is known as winter ore.

The Company own about 15,000 acres of land. Wood is cut on an average about 12 miles from the forges. It is coaled in closed kilns, of which there are over 20. About 40 cords of wood are cut on an acre, and in the kilns the wood yields quite or nearly 50 bushels to the cord.

Cost of charcoal from the Company's wood in 1866, about 9¾ cts.

The kilns are of the rectangular model, and cost about $2000. Their capacity is about 35,000 or 40,000 bushels per year. About 300 bushels of charcoal are consumed to the gross ton of iron.

Finished iron is hauled to Port Douglass, which is on the lake, a short distance south of Port Kent, and about 11 miles from Clintonville.

Blooms for steel that go to Pittsburgh are shipped at Port Douglass by boat to Rouse's Point, thence by rail to Ogdensburg, thence by boat to Cleveland, and thence by rail to Pittsburgh. Port Douglass has direct water communication with New York, Philadelphia, &c. In winter iron is sometimes hauled in sleds across the lake to Burlington, and is there shipped by rail.

The nominal capital of the Company is $800,000.

Hot blast was introduced into the forges about 1844.

Palmer Hill Mine is about 7 miles from Clintonville.

Wm. H. Cuyler was the manager of the works from 1859 to 1862. From 1862 to June 1866, Mr Cuyler and Mr. Taylor were associated in the management. Since the latter date Mr. Taylor has had the sole charge.

The product of the forges has been as follows, in *gross* tons:

1833,	836	1850,	3275
1834,	770	1851,	2899
1835,	683	1852,	2833
1836,	398	1853,	1923
1837,	1067	1854,	1567
1838,	1473	1855,	2374
1839,	1534	1856,	1824
1840,	1033	1857,	2375
1841,	1346	1858,	1655
1842,	1678	1859,	1931
1843,	1620	1860,	2326
1844,	2254	1861,	1083
1845,	2122	1862,	1058
1846,	1694	1863,	1881
1847,	2440	1864,	2346
1848,	2882	1865,	2153
1849,	2736	1866,	2500*

[*New Sweden Forge* (Clinton County), was on the north bank of the Ausable, 2 miles west of Clintonville. It was run by McLean & Fitzgeralds. It was partly washed away by the freshet of 1856, and never ran again. It worked ore from the Finch Bed chiefly. It was built about 1822, and rebuilt in 1846. It contained 2 fires.

The Brewster Forge, built in 1844, was on the south bank of the river nearly opposite the above. It was entirely washed away by the freshet of 1856. It was idle for some time before its destruction. It made about 200 tons of blooms in 1852, and a few tons in 1853.

Cook's Forge, 2 miles north of Clintonville, on the Little Sable River, was abandoned about 1852.]

{ LOWER BLACK BROOK FORGE, UPPER BLACK BROOK FORGE, SABLE IRON WORKS, JAY FORGE.

The above Forges, a very large tract of woodland, and extensive ore rights, are owned by Messrs. James & John Rogers, of Ausable Forks, Clinton County.

These gentlemen are the largest manufacturers of blooms in Northern New York.

The most important of the mines owned by the Rogers, and the one which now entirely supplies their forges, is the Palmer Hill Mine; they own five-eighths of this mine, the Peru Steel & Iron Company owning the balance. The parties have different openings.

The Palmer Hill Mine has been worked for a number of years. There is an immense dyke of trap rock running through the hill. At the Peru Company's opening, the dyke crosses the front of the mine, and the slopes are cut through it. At the other opening the dyke is also cut through, but the ore is taken from both sides.

The vein of ore averages about 30 feet in thickness. In some places it is more, in others less. It dips at an angle of about 45°. The Rogers have several slopes. In two of them tracks have been laid and the ore is drawn up in cars. The cars are so arranged that they empty their loads as they reach the top. The tracks are single. The hoisting is done by the winding of a wire rope around a cylinder; the power being furnished by a small horizontal engine. The cars go down into the slopes by gravity. The speed being regulated by frictional brakes.

The longest slope is about 600 feet. The width of the opening increases towards the lower end of the slope, and the extent of the excavation at the bottom is immense. The breast of ore now being worked is fine (Jan. 1867).

The mountain rock is crystalline and composed chiefly of feldspar, quartz, and some mica. There is also some primary limestone with the ore, and some altered sandstone in the neighborhood

The great dyke or horse is of trap. It grows thicker downwards; where pierced it is in the neighborhood of 14 feet. The walls of the vein are not distinct, and some rock is taken out.

The ore is lean and requires separation. One ton of separated ore is obtained from about 2½ tons of the yield of the mine. The magnetic crystals are small and the separation is very complete. Formerly the crystals were separated by means of magnets, but now the ore is only roasted, stamped, and washed in the ordinary way of this section, except that certain improvements have been introduced, especially at one of the separators. The separated ore is remarkably free from injurious substances. About 2 tons of separated ore yield 1 ton of blooms.

The Company employ from 125 to 150 hands in their mines. Wages from $1.25 to $3 per day. Average pay, miners $1.75, helpers $1.62.

The Peru Company's ore and mine is similar to that of the Rogers. The excavation, however, is not quite so extensive.

The Palmer Hill Mines are about 1½ miles from Ausable Forks.

The extent of land owned by the Messrs. Rogers is about 50,000 acres, about ¾ of which is timbered. There are 40 coal kilns in use. Attempts have recently been made, and with much success, to collect the pyroligneous acid set free in the kilns. As yet the works for this purpose are incomplete.

The quantity of coal produced in kilns and in pits in 1866 was 1,622,950 bushels, requiring 40,575 cords of wood.

There are three extensive stores in operation; one at Ausable Forks, one at Black Brook, and one at Jay. The quantity of goods sold in these stores is enormous.

The Lower and Upper Black Brook Forges are on Black Brook, ½ of a mile apart, about 4 miles N. W. of Ausable Forks, and 21 miles from Port Kent. The Lower Forge has 8 fires, and the Upper 4: in all, 12 fires. There are in both forges large centre-lift iron T hammers, cast in one piece, and weighing about 5 tons; there are 3 of these hammers run by undershot wheels. In the two forges there are 3 undershot, 1 breast, and 1 overshot wheels; in all 5 wheels. Privilege is very fair.

Ore is from Palmer Hill, 3 miles. Charcoal is hauled on an average about 8 miles. Iron is shipped at Port Kent.

Both the forges were erected in 1832. One was built by the Rogers; the other subsequently passed into their hands.

The Sable Iron Works are situated on the Essex County side of the Ausable River at the Forks, 17 miles from Port Kent. The works comprise a forge, a rolling mill, and a foundry.

The forge was built in 1848, on the site of the previous forge destroyed by fire. It contains 4 fires, 1 cast iron T hammer, similar to those of the Black Brook Forges, and 2 water wheels. The hammer wheel is an undershot, and the blowing wheel a scroll.

Ore is hauled 1½ miles, and charcoal on an average about 12 miles: it cost about 9¾ cts. in 1866.

The product of the Rogers' bloomaries is known as "Peru Iron." A very large proportion of it is used for steel in Pittsburgh. The end chunks are rolled in the mill into bars and nail plate. A considerable quantity of cut nails are made. The product of the Rogers works is sold as blooms, or is rolled into bars, or made into nails, according to the state of the market for these articles. For the last few years, a very large proportion of the product has gone in billets to Pittsburgh for steel. It is shipped in summer from Port Kent, chiefly via Rouse's Point, Ogdensburg, and Cleveland. In winter it sometimes crosses the lake on the ice, and is shipped from Burlington by rail. Some few bars for steel are rolled.

Iron for foundry purposes has to be brought from a distance, as no pig iron is made in this section.

Hauling iron from Ausable Forks to Port Kent cost in 1866 about $3 per gross ton.

The Jay Forge is on the south branch of the Ausable River, at the village of Jay, 6 miles south of Ausable Forks, and 23 miles from Port Kent.

It was originally built about 1809. It came into the possession of the Rogers's in 1864. It was previously owned by G. A. Purmort & Co.

It contains 5 forge fires, 1 hammer and 2 wheels. Bellows wheel is a turbine, and hammer wheel an undershot. Ore is from Palmer Hill, 7½ miles. Charcoal is hauled on an average 11 miles: it cost in 1866 about 9½ cts., cut on the property of the Company.

This is a fine forge, having recently been rebuilt.

The charcoal for all the forges is chiefly burned in closed kilns.

James and John Rogers are the owners of the four forges, but for convenience different styles of partnership are employed at the different works. At the Black Brook Forges, the style is J. Rogers & Co.; at the Sable Iron Works, J. & J. Rogers, and at the Jay Forge, Rogers & Co.

The production of these forges, in gross tons, has been as follows:

	1854	1855	1856	1857	1858	1859
Lower Black Brook Forge,	2369	2828	2452	1886	1499	2059
Upper " " "	867	1063	1021	1013	1076	655
Sable Iron Works,	500*	500*	300*	746	893	1094
Jay Forge,				00*	50*	100*

	1860	1861	1862	1863	1864	1865	1866	
Lower Black Brook Forge,	2265	2206	2107	2313	2234	2503	3000	
Upper " " "	955	930	748	896	882			
Sable Iron Works,	1166	921	1122	2225	2158	869	1093	
Jay Forge,	150*	00*	00			1073	1097	

In 1866, about 200 tons merchant and steel bar iron and 64,000 kegs nails were made. The balance of the production was sold in blooms.

The market for bloom iron is almost exclusively Pittsburgh, Pa., where it is used for steel. Steel iron in bars goes to New York City and Jersey City.

The capacity of the forges is about 7500 tons.

WILMINGTON FORGE is situated on the west branch of the Ausable River (12 miles above Ausable Forks), Wilmington Township, Essex County.

It is partly owned by Frederick Nye.

It contains 2 fires and 1 hammer. It was idle from 1854 to 1864. In 1865 and 1866, it made a few blooms from Arnold ore mined some time before. It is a small concern.

It is a very old forge.

[*Highland Forge* was situated on Howard Brook, about 7 miles S. of Keeseville, Essex County. It was built about 1837, and abandoned about 1857. It was owned by A. G. Forbes, and worked ore from the Moriah Mines.]

(*Bouquet River Forges.*)

WILLSBOROUGH FORGE is situated on Boquet River, at Willsborough Falls, Essex County. It was built about the year 1800, and made anchors until 1812. It has been rebuilt several times; the last time was in 1862. It is now in excellent order and one of the finest forges in this section. It has an iron roof.

The water privilege is very good. The facilities for transportation are good, as the Boquet River is navigable to within about 75 rods of the forge. The lake is about 2 miles distant.

The forge contains 4 fires, 1 iron hammer, weighing about 5 tons, and two wheels, 1 for the hammer and 1 for the bellows. The forge was idle from 1858 to 1862, inclusive. In 1863 it made about 300 tons; in 1864, 1865, and 1866, about 1000 tons each year.

Ore is from Moriah. It is shipped at Port Henry, generally in canal boats holding about 100 tons, and landed within a quarter of a mile of the forge. Water transportation about 24 miles. Return boats carry the finished iron, which goes chiefly to Troy.

Wood is cut on an average about 10 miles from the forge. It is coaled in closed kilns, of which there are a number. The owner of the forge is likewise the owner of many thousand acres of land in this section.

STOWER'S FORGE is on the N. branch of the Boquet River, and about 6 miles N. E. of Elizabethtown, and 8 miles N. W. of Westport, Essex County.

The forge was formerly owned by John L. Merriam, and known as Merriam's forge. It was owned subsequently for a few years by Wm. H. Roberts, and became the property of Wm. H. Stower, the present proprietor, in 1864.

The forge contains 3 fires, 1 wooden helve hammer weighing about 1800 lbs., and 3 water wheels. The water privilege is good.

The product of the forge is in blooms and slabs, which are shipped from Essex, 8 miles distant. Many of the slabs go to Coatesville, Pa.

Ore is from Moriah. In summer it is shipped from Port Henry, either to Essex, or Westport, and hauled thence in wagons 8 miles. In winter it is hauled on sleds from the mines, about 20 miles.

Wood is cut about 6 miles on an average from the Forge. There are several kilns in operation or building.

[*Wilder's Forge* was in Lewis Township, on the N. branch of the Boquet River, and near the State Road, 4 miles N. of Elizabethtown. It was owned by A. H. Wilder, and abandoned about 1861. It was built about 1844, and contained 2 fires.

It used Moriah ore chiefly.]

[*Whallonsburg Forge* was at Whallonsburg, on the Boquet River, 4 miles S. W. of Essex, Essex County. It contained 4 fires. It was abandoned about 1856.]

WESTPORT FORGE has been owned for many years by W. P. & P. D. Merriam. It is on the Boquet River, 4 miles N. of Westport.

It contains 3 bloomary fires, 1 hammer and 2 wheels. Water privilege is good.

Ore has been chiefly and is still, in part, from Moriah. It is transported by water from Port Henry to Westport, and thence by wagon. A mine has recently been opened on the property of the Company, and the ore is now used in some quantity.

There are several kilns in use.

VALLEY FORGE is on the Boquet River, at Elizabethtown, Essex County, about ⅓ of a mile N. of the village.

The forge contains 6 fires and 1 cast iron Rogers hammer, weighing about 11,000 lbs. The hammer is run by a breast wheel of about 19 ft. in diameter and 4 ft. bucket. The water privilege is not large. The blast is driven by a horizontal engine, having a cylinder of about 10 inches diameter and 30 inches stroke. There are 2 blowing cylinders. Steam is furnished by 2 boilers, heated by the escape heat from 5 of the fires.

The forge was built about 1846. It was owned a number of years ago by Whallon & Judd. In the spring of 1864 it became the property of the Lake Champlain Iron Company. In August of the same year, it was purchased by the Essex & Lake Champlain Ore & Iron Company. About the same time the same Company purchased the Kingdom Forge, the Burt and Nigger Hill Mines and extensive woodland property. In the spring of 1866 the Company put their whole property in the hands of Crowley & Hoblitzell (F. C. Crowley and W. L. Hoblitzell), who operated the two forges for about a year. They added two fires to the Valley Forge and 1 to the Kingdom Forge, making 6 fires at each. In Feb. 1867, Crowley & Hoblitzell failing, the property reverted to the E. & L. C. O. & I. Co.

Charcoal is made partly in closed kilns and partly in pits. There are 8 kilns belonging to the two forges: 6 to the Valley and 2 to the Kingdom. For the Valley Forge wood is cut on an average about 7½ miles from the forge, and cost in 1867 about 8¾ cts. per bushel, cut on property of Company.

Ore is from the Burt Mine, 10 miles S. S. E. of the forge. The ore is lean, yielding about 45 per cent. of separated ore, but the separated ore is of great purity, making a neutral and very malleable iron, well adapted for steel and wire. The "Burt" iron has quite an extended reputation. The separation is done at the mine by steam power; there is, however, a separator at each forge.

The Burt vein of ore dips at an angle of about 45°, and is opened by a slope some 300 feet long. The excavation at the bottom is of considerable size, being about 85 feet wide, and the breast of ore is about 14 feet. The ore is raised in a box that slides on beams laid down the slope; horse-power is employed. The mine is a fine one and the promise of ore good. The Fisher Hill Mine is near the Burt Mine. There are several smaller openings on the Burt lot, one of which is now being worked with fine promise.

The Nigger Hill Mine is owned by the same parties. It is not now worked. It is in an immense mass of magnetic ore, so rich that it does not require separation, but so hard that it has to be roasted. This ore is not equal to the Burt ore by itself in a forge fire, but is said to be well adapted for a blast furnace. The mine is about 6 miles S. of the Valley Forge.

Another opening owned by the same parties has been named the Mitchell Mine. It has not been worked to any extent.

Iron made at the Valley Forge is hauled in wagons to Westport 8½ miles, and shipped to Rouse's Point, New York, Troy, &c. Cost of hauling to Westport, in 1867, about $2¼.

There is a store at the Valley Forge, another at the Kingdom Forge, and a third one at the Burt Mine.

The extent of the property of the Company is about 11,000 acres.

Wm. G. Moorhead, of Philadelphia, is the head of the Company. Wm. G. Neilson, Agent.

KINGDOM FORGE, 6 miles S. E. of Elizabethtown, Essex County. This forge is on the Black River, which affords an excellent privilege.

This was formerly a small forge, containing but 2 fires. It was owned by H. R. Noble. It was enlarged in 1864, and again in 1866. It is now owned and operated by the same parties as the Valley Forge.

It contains 6 fires, 1 11,000 lbs. cast iron Rogers hammer, a (breast) hammer wheel, and an engine for blast. The latter has a cylinder of about 10-inch diameter and 30-inch stroke. Escape heat is used under boilers. Wood is cut on an average about 3 miles from the forge.

Ore is from the Burt Mine, 5½ miles distant. The Mitchell Mine, not now worked, is only about 1¾ miles from the forge.

The forge was built about 1825.

(See *Valley Forge*).

NEW RUSSIA FORGE, 4 miles S. of Elizabethtown, Essex County. E. H. & H. A. Putnam, owners. P.O., Elizabethtown.

This is a very old forge, having been built about the beginning of the century. It has, of course, been rebuilt several times, the last time in 1860.

The forge makes blooms for wire and for steel, and slabs for boiler plate. The shipping point is Westport, 12 miles distant (via Elizabethtown). Hauling to Westport cost in the fall of 1866 $2½ per gross ton.

The forge contains 4 fires and 1 wooden hammer, weighing about 1800 lbs. The hammer wheel is a breast of about 16 feet diameter and 5 feet bucket. The forge is on the Boquet River, and the privilege is fair. The blast can be driven either by steam, or water power. The steam engine has 2 cylinders of 8-inch diameter and 24-inch stroke.

Charcoal is made partly in closed kilns. Wood is cut on an average about 3½ miles from the forge. It cost in 1866, cut off the property of the Company, about 7¼ cents per bushel.

The Company own 10,000 acres of woodland.

In this section woodland yields nearly 40 cords to an acre, and the second growth replaces the first, so as to yield an equal number of cords in 25 to 30 years. The second growth is thicker, but the trees of course smaller than the first at the end of that time.

Ore is from the New Russia Mine, ½ mile W. of forge. It yields about 60 per cent. of separated ore, and makes a tough neutral iron. It is similar to the Fisher ore with which it is generally mixed in about equal quantities. The Fisher Mine is not owned by the Company; it is about 6 miles S. E. of the forge. The New Russia Mine belonging to the Company has been opened only about 2 years. The vein has as yet only been sunk to a depth of about 60 feet. The forge was built about 1847.

[*Dead Water Iron Works.* This forge was formerly owned by Jas. S. Whallon. It was on the State Road, 13 miles S. of Elizabethtown. It worked Moriah ore, and contained 4 fires. It was abandoned about 1857, and did very little for some years previous to that time.]

[*North Hudson Iron Works*, 18 miles S. of Elizabethtown and 5 miles S. of Dead Water Iron Works. This forge was owned by Jas. S. Whallon. It was abandoned in 1857. It contained 3 fires, and worked Moriah ore. It did but little for some years before it was abandoned. The forge was on the W. bank of the Schroon River, which afforded a fair water privilege.]

SCHROON RIVER IRON WORKS. John Roth, owner. Forge is on the W. branch of the Schroon River, where it crosses the State Road about 1 mile S. W. of Roth's Taveru and 24 miles S. S. W. of Elizabethtown, Essex County.

The forge was built in 1857 and passed into the hands of the present owner about 1861.

It contains 4 fires and 1 wooden helve centre-lift tilt hammer, weighing about 1800 lbs. The hammer wheel is a breast of about 13 feet diameter and 4 feet bucket. There is a second wheel to furnish power for the blast.

The water privilege is excellent and never fails. The head is about 16 feet. On the same dam there is a grist mill, and a saw mill is now building.

Wood is abundant and is cut within about 3 miles of the forge. There are 3 kilns at the forge.

Ore is from the Roth bed, about 12 miles E. of the forge. It is a good ore and separates about 50 per cent. Mine has been worked for about 6 years. It is now being opened at considerable expense by a horizontal tunnel. The promise of ore is good. When the supply of ore from Roth Bed is short, ore is brought from Moriah, about 17 miles distant.

A small quantity of scrap, bought in the neighborhood, is worked up.

Blooms, billets, and slabs are made. They are shipped from Crown Point, 19 miles distant.

HEAD OF PARADOX FORGE is at the head of Paradox Lake, Schroon Township Essex County. It is owned by John Roth.

It was built about 1864. In that year it made about 50 tons; in 1865, 100 tons, and in 1866 was idle.

It is a pocket forge of only 2 fires. It has a good water privilege. It contains 1 hammer and 2 wheels.

Ore worked was from the Scofield vein, which is a light vein of excellent ore, about 1 mile from the forge.

It made chiefly bar iron.

IRONDALE IRON WORKS, in Irondale, on Putts Creek, 6 miles W. of Crown Point, and about 4 miles E. of Crown Point Iron Company's Blast Furnace, Essex County. It was formerly known as Penfield's Forge. It is owned and operated by Penfield, Harwood & Co.

Iron made is shipped at Crown Point. It is used for steel, tools, and wire.

The forge is in good condition. It contains 4 bloomary fires, 1 centre-lift wooden helve hammer, weighing about 1800 lbs., and 2 wheels. Water privilege is fair.

The Company own extensive woodland property. Wood is cut on an average about 5 miles from the forge.

Ore is from the Penfield Mine owned by the Company. It is about 4½ miles W. of the forge. The ore is separated at the forge. It separates about 60 per cent.

The forge was built about 1828. It employs about 40 men.

TICONDEROGA IRON COMPANY. Geo. G. Sampson, President (N. Y.); F. W. Potter, Treasurer (N. Y.). The forge is now operated by the Burlington Manufacturing Co.

The building of the forge was commenced in the spring of 1864, and work began in it in February, 1865. In the fall of 1866, it was leased to the Burlington Manufacturing Company. The forge was built under the direction of Wm. E. Calkins, who was its superintendent until Nov. 1865.

The forge is located near the village of Ticonderoga, and near the foot of Lake George, about 2 miles W. of Ticonderoga, landing on Lake Champlain, Essex County.

The forge is large enough for 12 fires, but now contains but 6. There are 2 wooden helve centre-lift hammers, weighing about 2700 lbs. Hammer blocks weigh about 11,000 lbs. Hammers are run by breast wheels of about 19 feet in diameter and 4 feet face. Blowing is also done by water power; a 48-inch Chapman wheel is used for this purpose. There are 2 blast cylinders of about 5 feet in diameter, and 5 feet stroke.

There is a separating machine at the forge, which is operated by a 24-inch Chapman wheel.

Boats can come directly to the forge from Lake Champlain. The water power is magnificent. The volume of the stream is very great, as it is the outlet of Lake George. The head is 26 feet. The water is conveyed about 400 feet in a 6 feet tube.

The forge is one of the finest in Northern New York. The building is of wood, and the roof is of slate.

The Company own very extensive woodland property on the shores of Lake George. The wood is loaded on barges (there are 4 wood barges) which are towed by a small tug to the N. end of the lake. Here there are 4 closed rectangular kilns, capable of holding about 65 cords each. The charcoal is hauled from the kilns to the forge, about 2½ miles. It cost in the fall of 1866 about 8 cts. per bushel. The wood yields nearly 50 bushels to the cord. The kilns cost about $2000 each.

Ore first used at the forge was from the Skiff Mine, which is not now worked. It is about 11 miles from the forge and on the same mountain (opposite side) in which the Roth Mine is situated. The Company own considerable other mineral property. The Vineyard Mine is now being developed, the ore is sulphurous.

The ore now used is from Moriah. It is shipped from Port Henry direct to the forge.

Product of forge in 1865 was about 450 tons, and in 1866 about 300 tons.

[*West Fort Ann Forge, No.* 1, was situated about 5 miles W. of Fort Ann Village, Washington County. It was built perhaps as early as 1802, and abandoned about 1858. It was a small affair, containing but 1 bloomary fire. It made anchors and mill cranks from magnetic ore found in the vicinity, and from Moriah. Its product was very small.]

[*West Fort Ann Forge, No.* 2, was situated about ½ mile above West Fort Ann Forge, No. 1 (Washington County). It was similar to that forge, making anchors and cranks from magnetic ore of the vicinity, and from Moriah, and abandoned about the same time. It was built about 1828. It contained but 1 bloomary fire.

There are now no iron works in this township, except a small trip hammer shop making sleigh shoes, &c.

There is a magnetic ore mine in the town now being worked, and there are 1 or 2 others being opened.]

Northwestern District.

BRASHER IRON WORKS. On Deer River, in Brasher Iron Works Village, 7 miles N. of Brasher's Falls Station, St. Lawrence County. I. W. Skinner & Co., owners.

It is a small concern, making charcoal blooms, and bars, from scrap iron, and formerly made some blooms from Port Henry ore.

A foundry is connected with the works.

[*Brasher Centre Forge*, Brasher Centre, on St. Regis River, 6 miles from Brasher's Falls Station.

John Crapser is owner. Forge has not been running for a number of years, and is much out of repair.

It will probably not be run again.

It contained 3 forge fires, and made blooms.]

[The erection of a Catalan forge was commenced by the Harewood Iron and Mining Company, in Harewood, St. Lawrence Co., about 2 miles north of Cranberry Lake and 25 south of village of Russell. It is designed for 4 fires. The water privilege is excellent. The ore was to be from the neighborhood.]

[*Fullerville Iron Works*, 9 miles S.E. of Gouverneur Station, St. Lawrence Co., were abandoned about 5 years ago, and are now in ruins. It contained 2 forge fires, 1 hammer, and 2 water wheels. A small quantity of ore from Clifton and Rossie Townships, and some pig iron and scrap, were worked up. It was a small concern. C. H. Sprague is the present owner of the property. There is an old blast furnace near by.

(See *Furnaces.*)]

STERLINGVILLE FORGE, Sterlingville, Jefferson County, 4 miles east of Philadelphia Station. C. Essington, owner; J. Essington, lessee. Built about 1839. It is on Black Creek, below Sterlingville Furnace.

Contains 2 forge fires, 1 side-lift hammer, weighing about 1200 lbs., and 2 breast wheels.

Make blooms from scrap and pig, and draws out blooms into bars, which are used chiefly for the iron portions of edge tools.

Runs one fire about one-half the year, making only about 20 tons. Forge employs 1 man and 1 boy Fuel is charcoal, about 250 bushels to the ton

JEFFERSON NAIL WORKS, Carthage, about 14 miles S. E. of Philadelphia, Jefferson County. Mary E. McCollum, Owner. M. N. Gardner & Co., Lessees.

Contains 2 forge fires and 1 run out fire, the latter not now used. Blooms are made with charcoal from pig and wrought scrap, and are afterwards rolled into bars, nail plate, &c. The concern is a very small one.

[See *Rolling Mills.*]

New York City District.

WEST POINT FOUNDRY. R. P. Parrott, lessee; G. Paulding, ass'st. Cold Spring Putnam County.

The West Point Foundry is a very extensive establishment, embracing an immense foundry proper, a forge, boiler shop, pattern shop, machine shop, boring mill, &c. The whole devoted to the manufacture of ordnance, steam engines, hydraulic machinery, and heavy machinery generally.

The buildings are well built and arranged, and the facilities for transportation are good. The works are about ½ mile from Cold Spring Station, Hudson River Railroad, and a side track leads to them.

The works were erected in 1839. They were largely increased in size during the late rebellion, in consequence of the great demand on the part of the Government for Parrott Guns.

The forge department of the works is admirably arranged. There are 19 blacksmith fires and 5 heating furnaces, 5 Nasmyth hammers, and 1 steam engine (in the forge). The hammers are of the following weights: one of 8 tons, one of 3 tons, two of 1½ tons, and one of 1½ tons.

A large portion of the work done in the forge is in the manufacture of the wrought iron bands for the Parrott guns. These bands are made of bar iron piled, hammered, coiled on rolls, hammered on end, and shrunk on the guns. The bars are chiefly made at the Ulster Iron Works.

A number of large horizontal engines for blast furnaces have been built at these Works.

[*Ramapo Iron & Steel Works*, near Ramapo Station, Erie Railway, Rockland County. The ruins only remain. The works were abandoned about 1856. They were at one time quite extensive and made blooms, direct from the magnetic ore of this section; rolled them out into bars and converted it into steel, also made steel from steel scrap. They had both melting furnaces for cast steel and cementing furnaces for spring steel.

Prof. Leslie, in his *Forge Table*, gives the product for 1854 as 720 tons: 1855, 50 tons, and 1856, 150 tons (gross) "steel and iron." He says the works contained 2 bloomary fires. The amount of iron made in these fires during 1854, 1855, and 1856, was probably small.]

[*Suffern's Forge*, ¼ mile W. of Suffern Station, Erie Railway, Rockland County. Formerly made blooms direct from the ore in 2 bloomary fires. Was changed into a rolling mill in 1853. Made car axles until 1856. (See *Rolling Mills.*)]

[*Valley Forge*, New York City, on 52d Street, near North River. Abandoned.]

FRANKLIN FORGE, 25th Street and 1st Avenue, New York City. Tugnot, Dally & Co.

Forge contains 2 large open forge fires, 3 blacksmith fires, 4 heating and 1 scrap furnace, 6 boilers, 4 Nasmyth hammers, 4 large cranes, and 3 steam engines.

The largest hammer weighs about 8 tons, and has a fall of about 6 feet, and a cylinder of 27 inches. The second hammer weighs 5500 lbs. Its stroke is about 4 feet. The two others weigh about 3000 lbs. each, and fall about 3½ feet. The largest crane will carry 35 tons. The largest shaft ever made was 22 inches in diameter, and weighed about 55,000 lbs.

The engines are all of 12-inch cylinder, two of them have a 36-inch, and one a 24-inch stroke.

In the machine shop there are 3 large and 2 small lathes. Work from the forge is finished in the machine shop.

Product of forge is in heavy forgings, such as shafting for steamers, &c.

Capacity of forge is about 2800 tons. Scrap iron is used almost exclusively.

Coal used is from Pittston.

The proprietors of the forge, Tugnot, Dally & Co., declined to give figures of production for past years, on the ground that these figures might be used to further the cause of "protection," to which they were opposed. The figures in the table are therefore merely estimates.

[*Atlas Forge*, New York City, abandoned.]

[The following establishments in or near the city of New York, have hammers, and make forgings for themselves: The Novelty Iron Works (1 Dudgeon and 3 helve), Delamater Iron Works, Allaire Works (1 Dudgeon), Morgan Iron Works (1 Dudgeon), Etna Iron Works (2 Dudgeon), Dudgeon's Works (1 Dudgeon), Dry Dock Iron Works, Hudson River RR. Shop (1 dead-stroke Justice), South Brooklyn Steam Engine Works (Brooklyn—1 Dudgeon), and Brooklyn Navy Yard. There are probably others of the large steam engine works and machine shops of this section that have hammers. The product of hammered iron in these establishments, it would be almost impossible to determine, as the forges are mere departments of the works. The steam engine works of Wood & Mann at Utica have a hammer (Dudgeon).]

Buffalo District.

FRANKLIN FORGE. Buffalo. Drullard & Hayes, proprietors; Joseph Watson, superintendent. Has no direct rail or water connections.

Built in 1861. Contains 4 open fires, 1 heating furnace, 2 hammers and 1 steam engine of 10-inch cylinder and 12-inch stroke. One hammer is a Nasmyth of about 1500 lbs.; the other is a Watt, modified by Mr. Watson, the superintendent. It weighs about 1200 lbs. Mr. W. has applied for a patent on his valve arrangement, which is an application of the link motion.

The present proprietors took the forge in 1865, and enlarged it. Previously it contained

but one hammer, and was only a large blacksmith shop, chiefly employed in making oil well tools. The forge is now making car axles, cranks, shafting, and general forgings from scrap. Coal used is Blossburg. Utmost capacity about 325 tons. Product in 1866, about 175 tons. Estimated yearly product previous to 1865, 30 tons.

There is a foundry in connection with the forge, where some 1200 to 1500 tons iron per annum are made.

NIAGARA FORGE WORKS. In the southern part of Buffalo. Patchin & Delaney, owners.

Make heavy forgings, car axles, and do general railroad work.

The chief feature of the forge is a fine, double-acting steam hammer, weighing about 6 (gross) tons, and working on the Condi principle. The steam for lifting is admitted through one tube, that for forcing down, through another. It is chiefly used as a simple weight hammer. It was built by one of the proprietors, Mr. Delaney. Besides this large hammer there are three others; one is a Nasmyth of about 3500 lbs., and the two others are Watt hammers, one weighing about 2000 lbs., and the other about 1200.

The forge contains 8 open forge fires, 6 heating furnaces, 4 hammers and 2 engines. One of the engines has a 16-inch cylinder and 24-inch stroke; the other a 9-inch cylinder and 16-inch stroke.

The forge was built in 1853 by C. D. Delancy. It was enlarged in 1862–3.

Iron consumed is scrap. Coal is Blossburg. Some Bessemer steel ingots have been worked here.

Product of forge is chiefly in railroad work; steamboat shafting, and other heavy forgings are made. Anchors (for the lakes) are also occasionally made.

Capacity is about —— tons.

BUFFALO STEAM FORGE COMPANY, Buffalo. About 1½ miles south of New York Central Railroad Depot. Moore & Childs, proprietors; A. F. Johnson, superintendent.

Built in 1863-4. Commenced work in March, 1864. Contains 4 open fires and 3 heating furnaces, 2 hammers and 1 engine of 10-inch cylinder and 30-inch stroke. One hammer is a Nasmyth, built by Mr. Nasmyth in England; ram and dies weigh 5100 lbs., or over. The other hammer is a Watt, weighing about 1250 lbs.

Product of forge is in car axles, wagon axles, and general forgings. Wrought scrap is used exclusively. Coal is chiefly Blossburg, but some Erie also is used. Scrap balls are hammered, not squeezed.

Product in 1864, about 250 tons; in 1865, 500 tons; in 1866, 500 tons.

Utmost capacity, 650 tons.

[For the exclusive use of the members of the American Iron and Steel Association.]

STEEL WORKS IN NEW YORK.

A TABLE showing the name, owner, location, date of erection; number of cementing and melting furnaces, AND *number in use in* 1864; *number of hammers and trains of rolls; quantity and kind of power used. Production in* 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, *and* 1866. *Quantity of Coal consumed in* 1864. *Present capacity for all kinds of Steel. Present capacity for* CAST STEEL. *Capital invested, &c. &c.*

No.	NAME OF WORKS.	OWNERS AND LESSEES, OR PRINCIPAL OFFICERS.	LOCATION.	Date of beginning to make Steel.	Number of Cementing Furnaces.	Number in use in 1864.	Number of Melting Holes.	Number in use in 1864.	Number of Hammers.	Number of Trains of Rolls for Steel.	Number of Water-Wheels.	Number of Engines.
1	Onondaga Steel Works, . .	W. A. Sweet, *Prest. & Man.* George Barnes, *Treas.* Charles C. Bates, *Sec.*	Syracuse, N. Y.	1864	3	2	8	6	7	1	0	3
2	Troy Bessemer Steel Works,	John A. Griswold & Co. Z. S. Durfee, *Agent.*	Troy, N. Y.	1865	0	0	0	0	0	0	0	2
3	Montauk Iron & Steel Comp'y,	Wm. Rider, *Prest.* Emory Rider, *Treas.* Jos. Yates, *Supt.*	Mott Haven, West Chester Co., N. Y.	1862	0	0	38	38	5	4	0	5
	National Steel Works, . .	*Abandoned,*	New York City, ...	1863	. .	. .	. .	. .	. .	. .	. .	. .
4	New York City Steel Works,	G. Hand Smith, *Prest.* Jno. B. Thompson, *Sec. & Tr.* H. R. Demilt, *Supt.*	New York City, ...	1863	0	0	16	16	2	2	0	2
5	Continental Steel Company, .	Addee & Son, *Manuf.* Angell & Gilbert, *Agents.*	Maspeth, Queens Co., L. I., N. Y.	1866	0	0	36	0	1	2	0	2
	Union Iron & Steel Company,	Chas. S. S. Lennox, *Agent,* .	Staten Island.	1855	2	0	9	9	4	3	0	5
	Total, ...				5	2	107	69	19	12	0	19

Entered according to Act of Congress, in the year 1866, by HENRY MCALLISTER, JR., in the Clerk's Office of the District Court of the United States for the Eastern District of Pennsylvania.

New England and New York Tables compiled by W. G. NEILSON.

STEEL WORKS IN NEW YORK—*Continued.*

NAME OF WORKS.	PRODUCTION. (In Tons of 2000 lbs.)												
	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Onondaga Steel Works,	00	00	00	00	00	00	00	00	00	00	214	900	900
Troy Bessemer Steel Works,	00	00	00	00	00	00	00	00	00	00	00		
Montauk Iron and Steel Company,	00	00	00	00	00	00	00	00	100*	800*	1,600	00	00
National Steel Works,	00	00	00	00	00	00	00	00	00	50	400	50*	00
New York City Steel Works,	00	00	00	00	00	00	00	00	00	75*	300*	300*	00
Continental Steel Company,	00	00	00	00	00	00	00	00	00	00	00	00	100
Union Iron and Steel Company,	00	250*	250*	250*	250*	00	00*	200*	600*	1,000*	1,000*	200*	00
Total,	00	250	250	250	250	00	00	200	700	1,925	3,514		

* Estimated.

STEEL WORKS IN NEW YORK—*Continued.*

NAME OF WORKS.	Utmost Capacity for Cast Steel.	Utmost Capacity for all kinds of Steel.	Weeks in operation in 1864.	COAL CONSUMED IN 1864. (In Tons of 2000 lbs.)		Capital invested	REMARKS.
				Anthracite.	Bituminous.		
Onondaga Steel Works,	300	1,000	45	00	500	$———	
Troy Bessemer Steel Works,	00	10,000	00	00	00	$———	
Montauk Iron and Steel Company,	2,400	2,400	35*	3,000*	2,000*	$500,000	
National Steel Works,	. . .	. . .	50	2,000*	750	. . .	
New York City Steel Works,	700	1,500	42	900	300	$———	
Continental Steel Company,	1,200	1,200	00	00	00	$———	
Union Iron and Steel Company,	1,500	1,000	48*	2,500*	1,000*	$———	
Total,	6,100	17,100		8,400	4,550		

* Estimated.

STEEL WORKS IN NEW YORK.

ONONDAGA STEEL WORKS (Sweet, Barnes & Co.) are situated in the western part of the city of Syracuse. They were built in 1863-4, and commenced to make blister steel in 1864, and cast steel in February, 1865. The works were started for making mowing machines, knives, &c., and have gradually increased to their present extent.

W. A. Sweet is the President and Manager of the works; George Barnes, Treasurer; and Charles C. Bates, Esq., Secretary.

The product of the works is in blister steel and tool steel. The former is made from Norway, Swedish, and American iron. The cast steel is made chiefly from blister steel, though some steel scrap is used, and occasionally for low steel a small quantity of scrap iron.

The works contain 3 cementing furnaces, built with Mr. Sweet's flue modifications, and having a capacity of about 15 tons each; 8 four-pot melting holes; 4 large and 2 small heating furnaces; 4 hammers; 1 train of rolls; and 3 engines.

The pots hold 40 to 60 lbs. There are 2 eleven hundred lbs. hammers, falling 20 inches; 2 seven hundred lbs., falling 10 inches; 1 Davy (English) hammer; 1 eighty lbs. trip-hammer, and a second trip-hammer in the wagon spring shop. There is one pair of shears. Blossburg coal is used.

The building is a fine one, occupying three sides of a square. One wing, about 300 feet long, is occupied by the Onondaga Works, the other by the Ceresian Cutter Works belonging to the same Company. The front building contains the office and warehouse.

Mowing machine knives are made of cast steel; finger bars for the same are made from rolled blister steel. Wagon springs are made to the extent of about 80 per day. Each spring is tested twice. In the spring shop there are three small forge fires and a trip-hammer. The machine shop contains a number of fine machines. The cast steel made is used chiefly for tools.

The works contain 3 Corliss engines. The largest has an 18 inch cylinder and a 42 inch stroke; it is rated at 100 horse power. A 60-horse power engine runs the rolls, and the blowing is done by a 20 horse power engine.

The works, when in full operation, employ about 125 men.

A number of experiments have been made by Mr. Sweet with a view to devise a method for working titaniferous iron ores.

The product of the works in 1864 was 204 tons shear and 10 tons other steel; in 1865, 300 tons cast and 600 tons blister steel were made; in 1866, the product was about the same as in 1865.

Freights. Syracuse to New York by water (summer 1867), about $3\frac{1}{2}$ per ton; return freights, about $1\frac{1}{2}$.

THE BESSEMER STEEL WORKS are located in Troy, about 2 miles south of the post office, on the bank of the Hudson, and near the Albany Iron Works. They are owned by the firm of John A. Griswold & Co., consisting of Messrs. John A. Griswold, Erastus Corning, Erastus Corning, Jr., and John F. Winslow.

The works were commenced in 1863 by Messrs. John F. Winslow, John A. Griswold, and Alex. L. Holley, the owners of Mr. Bessemer's American patents—were built from the plans and under the superintendence of Mr. Holley, and went into operation in February, 1865. Their first machinery was of a temporary character, being designed for experimental purposes, but a more complete plant has since been erected, and the works now contain three converters (2 "five tons" and one smaller), with the necessary furnaces, blowing engine, and hydraulic apparatus, for conducting the manufacture of Bessemer ingots.

A forge is now in progress, which will contain 3 steam-hammers of 5, 8, and 10 tons respectively; and, when this is finished, forgings up to 10 tons in weight can be made here.

The ingots made at the works are now being worked at different forges in the country, especially at Nashua, N. H., and Bordentown, N. J., and the product has already been used in the manufacture of locomotive crank and straight axles, car axles, piston rods, boiler plates, plough steel, locomotive tires, horseshoes, &c. &c.

It is designed to use the steel chiefly for rails. A considerable quantity have been rolled at the Spuyten Duyvil Mill.

The present owners of the establishment are the proprietors of the Rensselaer Iron Works, also in Troy, and a large train is now being put in their new mill for rolling steel rails.

Mr. Z. S. Durfee is now superintendent of the works.

MONTAUK IRON AND STEEL COMPANY, of Mott Haven, West Chester Co., N. Y. The works of this Company were commenced and operated in a small way by the Harvey Steel and Iron Company, in 1854; subsequently they were used as experimental works in perfecting a furnace, now known as the "Dannemora Furnace," for producing wrought iron direct from the ore, up to 1862; since then upwards of $800,000 have been expended in extending the same. The operations of the Company commence with the mining of their own ore, in Putnam County, which is reduced to wrought iron by the direct process in the "Dannemora Furnace," and the iron then is converted to cast steel.

The buildings of the works cover an area equal to about 60,000 square feet, and contain 4 Dannemora furnaces; 38 melting holes; 9 reheating furnaces; 4 Dimfield fan blowers; 3 steam and 2 tilt-hammers, various sizes; 4 trains of rolls; 4 steam pumps; 5 steam engines, 150, 120, 45, 30, and 20 horse power; 15 steam generating boilers; 1 set large crackers, and 2 pair crushers, for pulverizing iron ore; aligator squeezers; shears for cutting iron and steel, &c. &c.

The production of iron in blooms and billets at these works, with the Dannemora Furnace, for the year comprising the last six months of 1863 and first six months of 1864, was about 1200 tons, all of which was rolled to bars and converted to cast steel in pots, making about 540,000 lbs., which was acknowledged, by the testimonials of more than forty prominent steel works, to be of a high grade for its exceeding toughness and great uniformity, both of which were mainly due to the uniformity and toughness of the iron.

These works, from a disagreement among the owners, have laid idle for nearly two years, but have now just gone into operation again, with a capacity equal to the production of 2400 tons of iron in blooms or billets per year, with facilities for putting the whole production into cast steel of the high grade above referred to. In making this production the Company will use about 9000 tons of Cumberland and 6000 tons Lehigh coal per year, and employ about 150 men. The capital stock of the Company is $500,000.

Wm. Rider is President; Emory Rider, Treasurer; Jos. Yates, Superintendent. Office, 16 Beekman Street, New York.

National Steel Works were located in New York City. They stopped in the early part of 1865. The works have since been torn down, and other buildings occupy their site. The officers of the Company were W. E. Bartlett, President; S. Mulliken, Treasurer; and John L. Mullikeu, Secretary.

The making of steel began in 1863. In that year they made about 50 tons, and in 1864 about 400 tons of cast steel. Lake Champlain iron was used. No blistering was done.

The works contained 38 melting holes, 4 hammers, and 2 trains of rolls. They consumed in 1864, 450 tons iron, 2750 tons anthracite and bituminous coal, and 9800 crucibles. The crucibles were obtained in part from Taunton and in part made at works.

Value of steel made in 1864 was about $150.000. Utmost capacity of works was 1500 tons.

NEW YORK CITY STEEL WORKS, 18th and Avenue B, New York City. G. Hand Smith, M.D., President; J. B. Thompson, Secretary and Treasurer; Henry R. Demilt, Superintendent.

These works were built by Austin, Kelly & Co., and commenced work in 1863. In May, 1864, the firm became Kelly, Demilt & Co., and so continued until December, 1865, when the works were closed. The works have since been generally idle. In May, 1867, the present Company took the works, and have been preparing to go into the manufacture of steel by Dr. Smith's process. The works will probably be in operation in November, 1867.

A new and large converting furnace, a balling and a heating furnace have recently been erected. There are two other heating furnaces, beside a large heating furnace containing 5 retorts.

There are 16 four-pot melting holes, 2 trains of rolls, 1 Davy hammer, 1 10-inch Dudgeon hammer, and 2 engines. The engine for the rolls is horizontal; it has a cylinder of $20\frac{1}{2}$ inches, and a stroke of 48 inches. The second engine has a 10-inch cylinder and 20 inch stroke. Capacity to melt is about 3 tons per day. When running, about 3 tons anthracite and 1 ton bituminous coal were used to the ton of finished steel. Iron formerly used was chiefly from Lake Champlain. Steel was used for machinery, tools, files, cutlery, &c.

CONTINENTAL STEEL COMPANY (Augell & Gilbert, office 54 William Street, N. Y.). Adee & Son, manufacturers. Works at Maspeth, on New Town Creek, Queens Co., Long Island, 2 miles from Grand Street Ferry Landing, Brooklyn.

Works were commenced in 1865, and are not yet completed. Manufacture of steel was commenced in early part of 1866, but only about 100 tons were made that year.

The works contain 20 two-pot and 16 four-pot melting holes, 2 heating furnaces, 1 welding furnace (a small heating furnace), 2 trains of rolls, 1 hammer, and 2 engines. The heating furnaces will hold about 1 ton each. The hammer is a Merrick, with a head weighing about 500 lbs. The trains are run by a horizontal engine of about 22-inch cylinder and 5 feet stroke. The blowing is done by a smaller engine. There are 2 small steam pumps. Steam is furnished by 6 cylindrical boilers, 30 feet long and 30 inches in diameter, which are heated by the escape heat from the melting holes. There are two rows of holes, and the boilers are between them—three boilers in each set.

Coal used in melting holes is anthracite, in heating furnaces Cumberland.

Iron is chiefly from Lake Champlain. Conversion is done in pots.

Cast steel of different descriptions is made. Speciality of works is "decarbonized steel," which is used for gun barrels and other purposes.

Company make most of their own crucibles and expect to make all.

UNION IRON AND STEEL COMPANY. The Damascus Steel and Iron Company was organized about 1855, and erected works on Staten Island, where iron and steel were made. Some iron was made in the latter furnace. Pig iron was also puddled. Cast steel was made. Company ran several years, and stopped business about 1860.

The New York Steel Company was formed soon after, and made cast steel by pot conversion, at one time as much as 5 or 6 tons per day. The Company erected two converting furnaces, but never used them for making blister steel. Geo. Nock was superintendent. Iron used was chiefly "Peru iron," also some Norway iron and steel scrap were used. The New York Steel Company stopped work about 1865.

The Union Iron and Steel Company was formed this year (1867), and are now holding the works, but not manufacturing.

The works are at Elm Park, Staten Island, and are very extensive. Chas. S. S. Lennox, 76 William Street, New York, is the agent of the Company. The property is for sale.

The works contain 2 converting furnaces; 9 seven-pot melting holes; 1 puddling furnace, 1 annealing furnace, and 5 heating furnaces; 6 finishing, *hollow*, fires; 2 wooden helve tilt-hammers; 2 cogging hammers; 5 engines, &c. A crucible factory is connected with works.

The American Tool Company are now erecting works in Brooklyn, Eastern District, and propose to go into the manufacture of tool steel.

The works are well advanced, and the Company will probably make steel before the close of this year (1867).

The works are to contain 24 four-pot melting holes, 3 hammers, 2 trains of rolls, &c. It is also proposed to erect a gas regenerative furnace, to contain 20 or more pots.

A gas regenerative furnace is being built for experiments with chromium in the manufacture of steel.

The office of the Company is 74 Broadway, N. Y. Robt. P. Parrott, President; C. P. Haughian, Superintendent; J. Baur, Chemist.

The Ramapo Iron and Steel Works probably made some steel about 1854, but soon after stopped work. See *Forge Table.*

RECAPITULATION.

	Number in 1866.	Number in operation in 1866.	Number in operation in 1864.	PRODUCTION. (Tons of 2000 lbs.)												
				1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Charcoal Blast Furnaces, .	24	19	18	34,970	33,873	30,862	21,956	15,364	13,560	13,417	11,897	16,532	18,832	20,218	21,822	24,920
Rolling Mills, ...	22	21	17	40,342	47,899	58,172	50,585	50,015	61,241	53,163	53,360	71,290	85,957	113,475	103,666	129,144
Forges, ...	23	20	19	14,701	15,989	15,422	15,017	13,976	14,765	16,579	12,195	12,188	17,673	20,716	20,575	23,313
Steel Works, ...	6	3	5	00*	250	250	250	250	00	00	200	700	1,925	3,514		

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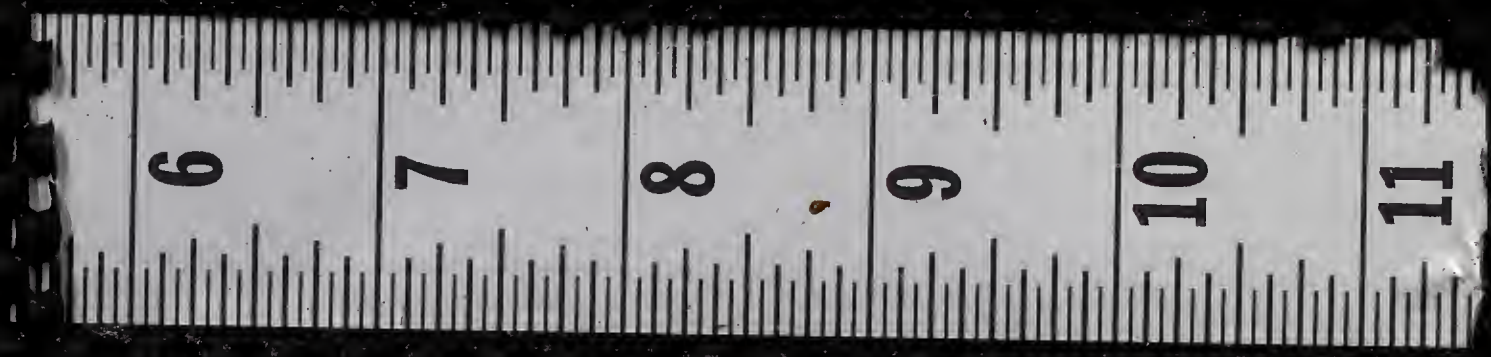
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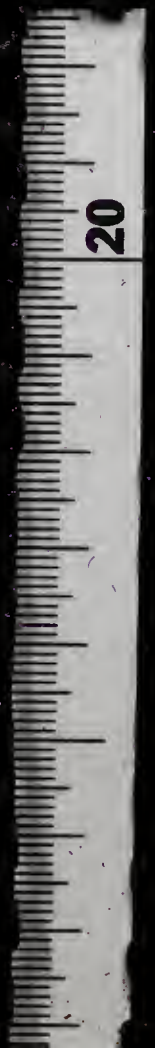
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